HMT (INTERNATIONAL) LIMITED

A Govt. of India Undertaking

(OPEN TENDER)

BID DOCUMENTS

FOR SUPPLY, INSTALLATION & COMMISSIONING, TRIAL OF Autotronics Equipment, Machine Tools, Refrigeration & Air Conditioning Trainer Equipment, Refrigeration & Air Conditioning Tools & Equipment, Electrical Machine Trainers, Electronic Trainers, Electrical Panels & Electrical Items

For

Supply of Technical and Vocational Education Training (TVET) equipment and providing Technical Assistance to Vocational Training Centres in Yatta & Hebron, Palestine

(being implemented on behalf of DPA-II Division, Ministry of External Affairs, Government of India)

TENDER NO: HMTI/PROJ/PALESTINE/S-001/2014 Dated 01.12.2014

LAST DATE FOR COLLECTION OF TENDER DOCUMENT: 22.12.2014 17.00 HRS

CLOSING ON: 23-12-2014, TIME 10.00 HRS

TECHNICAL BID OPENING ON: 23-12-2014 TIME 10.30 HRS

PLACE: HMT(I) Board Room, HMT Bhavan,No.59, Bellary Road, Bangalore.

The Tender document issued against payment of Rs 2,500.00 *(Rupees Two Thousand Five Hundred only) in the* form of a Demand Draft towards cost of tender document. The Bidder who chooses to download tender document from website must submit the Demand Draft towards cost of the Tender documents along with Technical bids in Envelope-I.

ATTENTION

1. Only sealed Tenders shall be entertained. All joints of envelope should be sealed with wax or with cello tape to ensure it is tamper proof.
2. Tenders not sealed shall be rejected straight away.
3. Do not use window envelope.
4. Lot-wise Technical Bid and Commercial Bid to be put in a separate cover super-scribing Tender Ref. No., Date, Submission date, Lot number and Bidder address on the top of envelope.
5. The Bidder may depute their authorized representative to witness the tender opening for both Technical and Commercial Bids.

HMT Bhavan, No.59, Bellary Road, Bangalore 560 032
Tel: 91- 80- 2333 9060, Fax: 91- 80- 2333 9048 / 2333 9286
Web Site: www.hmti.com E-mail:contactus@hmti.com

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SECTION I: INVITATION FOR BIDS (IFB)

1. HMT (International) Ltd, [HMT (I)] Bangalore invites sealed bids from eligible Indian bidders for supply, installation, commissioning & Trial of following items for project 'Supply of Technical and Vocational Education Training (TVET) equipment and providing Technical Assistance to Vocational Training Centres at Yatta & Hebron, Palestine being implemented on behalf of DPA-II Division, Ministry of External Affairs, Government of India as per the Schedule of Requirements / Scope of Supplies (SR) - (Section IV).

Sl.No	LOT Reference	ITEM
1	LOT – 1	Autotronics Equipment
2	LOT – 2	Machine Tools
3	LOT – 3	Refrigeration & Air Conditioning Trainer Equipment
4	LOT – 4	Refrigeration & Air Conditioning Tools & Equipment
5	LOT – 5	Electrical Machine Trainers
6	LOT – 6	Electronic Trainers
7	LOT – 7	Electrical Panels
8	LOT – 8	Electrical Items

HMT(I) invites sealed bids from eligible bidders for the Supplies as above with details listed in Section IV.

Part bidding among the Lots is allowed and Part bidding within the lot is not allowed. Bidders shall quote for all the items within the lot.

2. **Contact information**

The General Manager, Projects
HMT (International) Limited,
59, Bellary Road, Bangalore-560032, INDIA
Tel No.: 080- 23339060
Fax No.: 080- 23339048 / 23339286
E-mail: contactus@hmti.com / ksridhar@hmti.com

3. **Two bid System**

The two bid system will be followed. The bidder must submit his offer in two separate sealed envelopes as explained below:

Offer in the prescribed forms Section – V, Annexure 1 to 8 should be submitted in the following manner.

Envelope I: "Technical bid": The sealed envelope shall contain all the copies of Lot-wise technical bids together with Commercial Bids separately without indicating the prices. This envelope shall be clearly marked **"Part I - Technical bid",** indicating Tender No., Lot Number, Closing Date & Time and bidder address duly filled-in **(separately for each Lot)**.

The Envelope-I should be duly sealed on all joints with wax or tamperproof sealing using cello tape.

This part shall include / indicate the following:

1. The Bidder shall provide requisite documentary evidence for pre-qualification criteria as stated below, **failing which, the Bids may result in rejection:**
   - The Bidder's average annual turnover for 3 years **for each** lot shall be atleast as mentioned below against each Lot in the last three financial years.

     LOT -1: **Rs.245.00 lakh (Rupees Two hundred Forty Five lakh only)**
     LOT -2: **Rs.40.00 lakh (Rupees Forty lakh only)**
     LOT -3: **Rs.160.00 lakh (Rupees One hundred Sixty lakh only)**
     LOT -4: **Rs.40.00 lakh (Rupees Forty lakh only)**
     LOT -5: **Rs.60.00 lakh (Rupees Sixty lakh only)**
     LOT -6: **Rs.60.00 lakh (Rupees Sixty lakh only)**
     LOT -7: **Rs.60.00 lakh (Rupees Sixty lakh only)**
     LOT -8: **Rs.40.00 lakh (Rupees Forty lakh only)**

     - The Bidder shall quote for all the Lots or part bid among the lots mentioned under Scope of Supply. However, **part bidding within the lots is not allowed**.
     - In case, the Bidder quotes for more than one lot, the turnover shall be sum of the value given against each lots.

- The Bidder must have minimum 3 years continuous experience in manufacturing / supply of items specified in the Scope of Supply. **Attach at least one Purchase Order copy of each year separately for three years.**
- Bidder should submit satisfactory certificate from at least 2 reputed clients to whom similar nature of supplies have been made.

2. *The Bidder shall submit Earnest Money Deposit as indicated below against each lot in the form of Demand Draft drawn in favour of HMT (International) Limited payable at Bangalore in separate envelopes for each lot in the Technical Bid.* .

LOT -1: **Rs.1,65,000/- (Rupees One lakh Sixty Five thousand only)**
LOT -2: **Rs.28,000/- (Rupees Twenty Eight thousand only)**
LOT -3: **Rs.1,05,000/- (Rupees One lakh Five thousand only)**
LOT -4: **Rs.35,000/- (Rupees Thirty Five thousand only)**
LOT -5: **Rs.40,000/- (Rupees Forty thousand only)**
LOT -6: **Rs.40,000/- (Rupees Forty thousand only)**
LOT -7: **Rs.35,000/- (Rupees Thirty Five thousand only)**
LOT -8: **Rs.25,000/- (Rupees Twenty Five thousand only)**

- **The Total Earnest Money Deposit to bid for all the Lots is Rs.4,73,000/- (Rupees Four lakh Seventy Three thousand only)**
- The Bidder shall quote for all the Lots or part bid among the lots mentioned under Scope of Supply. However, **part bidding within the lots is not allowed**.
- In case, the Bidder quotes for more than one lot, *the Earnest Money Deposit* shall be sum of the value given against each lots.

3. The bidder must be a manufacturer or an authorized dealer or HMTI vendor.
4. Technical bids without prescribed cost toward tender cost & EMD in the form of Demand Draft/ Purchase receipt will be rejected summarily.
5. Bid document Purchase Receipt or DD in favour of HMT(I), *Bangalore for Rs.2,500/- if tender documens* is downloaded from website.
6. Duly filled Technical bid for each Lot separately with proper seal and signature of the authorized person on each page of the bid submitted.
7. Complete Scope of Supplies with all necessary details and acceptance of commercial terms and conditions as provided under Section IV & V Lot-wise separately.
8. Make / Model for each of the item to be specified in the bid and the Catalogues to be enclosed with the technical bid.
9. Bids shall be valid for a minimum period of 90 (ninety) days from the last date of submission.
10. Furnish acceptance for providing Performance Bank Guarantee for 10% of the contract value in the event of tender being awarded.
11. Point-wise details for the services/requirements/details required in the bid documents shall be furnished. If there are any deviations, the same should be clearly specified in Annexure-2 of Section-V.
12. Self attested copy of VAT registration certificate as applicable.
13. List of customers both domestic & overseas to whom similar supplies have been provided in the past 3 years in the prescribed format Section-V, Annexure-3.
14. Satisfactory certificate from at least 2 reputed clients to whom similar nature of supplies has been rendered.
15. Vendor Registration form – Section – V, Annexure – 5 duly filled {Only for New Vendors of HMT(I)}.
16. Copy of ISO-9000 Certificate, if applicable.
17. Payment Terms. As per clause 12 in Section-III. Specify deviations if any.
18. A copy of "Un-Priced Section – V, Annexure–1" i.e., a copy of the Price Schedule without the price details.

Envelope II: "COMMERCIAL BID": This sealed envelope shall contain price details. This envelope shall be clearly marked **"Part II - Commercial Bid",** indicating Tender No., Date & Time, Lot Number and bidder address duly filled **(separately for each Lot).**

The Envelope – II should be duly sealed on all joints with wax or tamperproof sealing using cello tape.

- Prices should be offered in **Indian Rupees only**. Should furnish break up of price as required in Section V; Annexure – I. The prices quoted shall be for **FOR Nhavasheva Port** and considered firm and not subject to any change.

- The supplies will be inspected by HMTI by deputing quality assurance personnel to the vendor's worksite. Vendors are required to reimburse the Cost of Inspection at 6% of the total order value + Service Tax as applicable.

- All prices & other information like discount etc., having a bearing on the prices shall be written both in figures & words in the prescribed offer form. In the event of difference, the price in words shall be valid and binding. **If any service tax is applicable, the same should be indicated separately.**

- The terms of payment for supplies will be as indicated under clause 12 in Section-III – Terms and conditions of the tender. The bidder has to accept the payment terms. Any deviation in the payment terms offered shall be considered and suitable Bank interest of 18% per annum will be loaded for comparison purposes only. However acceptance of the payment terms indicated by the bidder is subject to approval of HMT(I) Purchase Committee.

- **The bidder should quote their lowest possible price.**

- L1 shall be decided on Lot price basis.

4. **Date of submission of bids and opening of the Technical bid:**

Both the envelopes (Part I & II) Lot-wise shall be put in one cover, duly sealed on all joints with wax or tamperproof sealing using cello tape and super scribing Tender No., closing date & time, opening date & time, Lot number and Bidder address.

The envelopes, which are not sealed, will be rejected straightaway/summarily.

The sealed bids should be dropped in the tender box provided in the HMT(I) office and ensure delivery **on or before 1000 hrs (IST) on the closing date**. Late offers will not be considered.

Last date for Collection of Tender: 22.12.2014 up to 17.00 hrs
Last date for Submission of bids: 23.12.2014 up to 10.00 hrs
Technical bids will be opened on 23.12.2014 at 10.30 hrs in the Board room of HMT(I) office, Bangalore.

End Of Section - I

SECTION II- INSTRUCTIONS TO BIDDERS (ITB)	
1	**Definitions and Interpretation** The **"HMT(I)" / "BUYER"** means: HMT(International) Limited, No.59, Bellary Road, Bangalore-560 032. The **"Supplier"** means any firm/institute/company to whom the contract is awarded. **"SITES"** means Training Centres at Yatta and Hebron, Palestine, where the supplies are required to be supplied, installed / erected and commissioned. **"PROJECT"** means 'Supply of Technical and Vocational Education Training (TVET) equipment and providing Technical Assistance to Vocational Training Centres in Yatta & Hebron, Palestine' being implemented on behalf of DPA-II Division, Ministry of External Affairs, Government of India.
2	**Compliance of Requirements** The supplies offered should be in accordance with the stipulated requirements in the "Scope of Supply". The bidder shall indicate his compliance or non-compliance against each of the requirements.
3	**Place of Delivery of supplies**
	All supplies are to be delivered to HMT(I)'s shipping agent at Nhava Sheva port as per the instructions given by HMT(I) at the time of dispatch.
4	**Criteria for pre qualification of Bidder** **The Bidder shall satisfy the following prequalification criteria:** The Bidder shall provide satisfactory documentary evidence acceptable to HMT(I) to show that:
4.1	The Bidder's average annual turnover for **each lot** shall be at least as indicated below in the last three financial years. The Bidders should furnish audited accounts for previous 3 years. LOT -1: **Rs.245.00 lakh (Rupees Two hundred Forty Five lakh only)** LOT -2: **Rs.40.00 lakh (Rupees Forty lakh only)** LOT -3: **Rs.160.00 lakh (Rupees One hundred Sixty lakh only)** LOT -4: **Rs.40.00 lakh (Rupees Forty lakh only)** LOT -5: **Rs.60.00 lakh (Rupees Sixty lakh only)** LOT -6: **Rs.60.00 lakh (Rupees Sixty lakh only)** LOT -7: **Rs.60.00 lakh (Rupees Sixty lakh only)** LOT -8: **Rs.40.00 lakh (Rupees Forty lakh only)**
4.2	The Bidder must have minimum 3 years continuous experience in manufacturing / supply of items specified in the Scope of Supply. **Attach at least one Purchase Order copy of each year separately for three years.**
4.3	Bidder should submit satisfactory certificate from at least 2 reputed clients to whom similar nature of supplies has been rendered.
	If the Bidder does not submit the above-required information along with documentary evidence at the time of bidding; the bid may be rejected.
5	**Cost of bid documents**
	○ The cost of bid document is Rs. 2,500.00 (Rupees Two Thousand Five hundred only). ○ The cost shall be payable in the form of a crossed Bank draft in favour of HMT (International) Ltd, Payable at Bangalore and kept along with the Technical bid documents in Envelope –I, if the bid documents are downloaded from website. ○ If the documents are purchased from HMT (International) Limited, copy of the receipt for payment of cost of bid documents shall be kept along with the Technical bid documents in Envelope –I. ○ In case, the Bidder quotes for more than one lot, the copy of the receipt for payment of cost of bid documents shall be kept along with the Technical bid documents in Envelope –I for each lots separately. ○ If the cost of bid document is not paid before opening of the Technical bid, the bids will be rejected straightaway/ summarily.
6	**Earnest Money Deposit**
6.1	Earnest Money Deposit for the amount as stipulated in the "Bid Invitation" shall accompany Technical bid documents of tender. The Earnest Money Deposit shall be in the form of a crossed Bank Draft in favour of HMT (International) Ltd, Payable at Bangalore. In case, the Bidder quotes for more than one lot, the copy of the crossed Bank Draft shall be kept along with the Technical Bid documents in Envelope –I for each lot separately.
6.2	The Earnest Money Deposit shall remain deposited with HMT(I) for a period of 90 (ninety) days from the date of opening of tenders. If the validity of the offer is extended, the EMD shall remain with HMT(I).
6.3	No interest will be payable by HMT(I) for the Earnest Money Deposit.
6.4	The Earnest Money deposited is liable to be forfeited if the bidder withdraw or amends, impairs or derogates from the tender in any respect within the validity period of his offer.
6.5	The Earnest Money Deposit of the successful bidder will be returned after the P.O. is released on successful Bidder and duly accepted and submission of Performance Guarantee.

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6.6	If the successful Bidder fails to furnish a contract performance guarantee, then the earnest money shall be liable to be forfeited.
6.7	The Earnest Money Deposit of all unsuccessful Bidders will be returned to the bidder by HMT(I) after finalization of contract with the successful bidder.
6.8	If Earnest Money Deposit as stipulated in the "Bid Invitation" is not enclosed in the Technical documents in Envelope –I, the bid will be rejected straight away / summarily
7	**Period of validity of bids**
7.1	Bids shall be valid for a minimum period of 90 days from the last date of submission.
7.2	HMT(I) may ask for the bidder's consent to extend the period of validity. Such request and the response shall be made in writing only. A bidder agreeing to the request for extension will not be permitted to modify his bid. Technical clarifications, if any, shall be furnished by Bidder within one week's time.
8	**Deadlines for submission of bids** Bids must be received by HMT(I) before the due date and time at the address specified in the tender document. In the event of the specified date for the submission of bids being declared as a holiday for HMT(I), the bid-closing deadline will stand extended to the next working day up to the same time.
8.1	HMT(I) may extend this deadline for submission of bids by amending the bid documents and same will be suitably notified in HMT(I) website: www.hmti.com
8.2	Any bid received by HMT(I) after the deadline for submission of bids, will not be accepted and returned unopened to the bidder.
9	**Opening of Commercial bids by HMT(I)**
9.1	The Technical Bids will be evaluated to shortlist the eligible bidders.
9.2	Bidder whose Technical Bid is found to be acceptable and meeting the eligibility requirements as specified in "Clause 4" will be informed about the date and time of the opening of the Commercial Bid.
9.3	HMT(I) will open Commercial Bids of only the technically accepted and short listed bids, in the presence of the bidder or their authorized representative who choose to attend the bid opening, at the time and date to be informed later.
9.4	The bidder's authorized representative who attends the bid opening shall sign an attendance register as a proof for having attended the bid opening.
9.5	The bidder's name, bid prices, discounts and such other details considered as appropriate by HMT(I), will be announced at the time of opening of the Commercial Bids.
10	**Comparison of Bids** Bids received against the tender will be evaluated by the Technical Evaluation Committee (TEC) to ascertain the technical suitability and will be shortlisted.
10.1	Short listed Technical bids only will be considered for Commercial Bid opening and commercial evaluation.
11	**Award Criteria**
11.1	HMT(I) will award the contract to the eligible bidder whose technical bid has been accepted and determined as the lowest evaluated Commercial Bid on Lot-wise basis.
11.2	Should the amount put in words differ from the amount put in figures, or if there is an arithmetical error, the lesser amount will be taken unless the difference is attributable to an obvious error, whereupon the correct amount will be taken.
11.3	If more than one bidder quotes same lowest price, HMT(I) reserves the right to award the contract at its own discretion.
11.4	HMT(I) reserves the right to increase or decrease the quantum of supplies offered by the successful bidder at the rates & other terms and conditions offered by them. The Bidder is bound to accept the increase or decrease in the quantum of supplies during awarding of the contract.
12	**HMT(I)'s Right to amend Scope of Supplies**
12.1	HMT(I) reserves the right to accept or reject any or all bids without assigning any reason whatsoever.
12.2	HMT(I) reserves the right to increase or decrease the scope of supplies indicated in the bid documents after the award of the tender and payment shall be made on pro-rata basis.
12.3	HMT(I) reserves the right to cancel/short close/extend the order at any given point of time due to Force Majeure or directions from the Governments of India or Palestine.
12.4	HMT(I) reserves the right to cancel / short close the order due to non-satisfactory performance by any of the service / supply offered. Cost / damages arising out of such cancellation / short closure shall have to be borne by the bidder.
12.5	Buyer shall recall any of the experts deputed to the project site on non-compliance to the rule of the land or guidelines laid down by Govt. of India / Govt. of Palestine / HMT(I) or any act that does not correspond to ethical behavior. Cost /

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	damages arising in such an event shall be borne by the bidder and shall forthwith send suitable replacement.
13	**Corrupt or Fraudulent Practices.**
13.1	HMT(I) requires that the bidders who wish to bid for this project have highest standards of ethics.
13.2	HMT(I) will reject a bid if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices while competing for this contract;
13.3	HMT(I) may declare a vendor ineligible, either indefinitely or for a short period, if HMT(I) is aware that the vendor has engaged in corrupt and fraudulent practice during the execution of the contract.
14	**Interpretation of the clauses in the Tender Document / Contract Document** In case of any ambiguity/ dispute in the interpretation of any of the clauses in this Tender Document, HMT(I)'s interpretation of the clauses shall be final and binding on all parties.
15	**General**
15.1	All offers shall be either Computer prints or hand written neatly in indelible ink. Tenders shall be free from CORRECTION AND ERASURES, and Corrections if any, must be attested. Each page of the offer must be numbered consecutively, should bear the tender number and should be signed by the Bidder at the bottom. A reference to the total number of pages comprising offer must be made at the top right hand corner of the first page.
15.2	The Bidders must ensure that the conditions laid down for submission of offers detailed in the preceding paras, are completely and correctly fulfilled.
15.3	The submission of any offer connected with these supplies and documents shall constitute an agreement that the Bidder shall have no cause of action or claim, against HMT(I) for rejecting the offer. HMT(I) shall always be at liberty to reject or accept any offer or offers at its sole discretion
15.4	Offers shall be deemed to be under consideration immediately after they are opened and until such time the official intimation of award of contract is made by HMT(I) to the Bidder. While the offers are under consideration, Bidders and or their representatives or other interested parties are advised to refrain from contacting HMT(I) by any means. If necessary, HMT(I) will obtain clarifications on the offers by requesting for such information from any or all the Bidders, only in writing. Bidders will not be permitted to change the contents of their offers after the offers have been opened.
15.5	Any individual(s) signing the tender and related documents should be a competent, authorised person or original copy of power of authorization issued by the competent authority should accompany the tender.
15.6	Offers shall be as per the Instructions to Bidders and Terms & Conditions of contract given in bid documents. However the Bidder shall indicate his acceptance or otherwise against each of clause and sub clauses of the Instruction to Bidders and Terms & Condition of contract. For this purpose, the Bidder shall enclose a separate statement as per format Section-V(2) indicating only the deviations from any clause or sub clause of the Instructions to Bidders and Terms & Conditions of contract which Bidder proposes with justification for each deviation. The HMT(I), however reserves the right to accept or reject these deviations and decision there on shall be final and binding.
15.7	Bids shall be complete in all respects accompanied by detailed literature, brochures with all necessary details in ENGLISH or otherwise, the bids will not be considered.

End of Section - II

SECTION III: SPECIAL CONDITIONS OF CONTRACT (SCC)	
1	Execution: Metric System
2	Colour : As specified in the Technical Specifications.
3	Electricals: Main supply: 380 V, 3 Ph, 50Hz AC 4 wired / 220 V, 1 Ph, **50Hz** AC Supply
4	Delivery period for supplies: FOR Nhava Sheva port within 8 weeks from the date of purchase order. Delivery is the essence of the Contract. If there is delay penalty as per clause 14 is applicable.
5	Inspection, Re inspection and Acceptance: The items shall be manufactured as per International Standards. The standards followed should be accepted by HMT(I). For this purpose, the supplier shall furnish HMT(I) the standards being followed immediately for acceptance. The supplies will be inspected by HMT(I) as decided by HMT(I). If any of the item is found defective, HMT(I) reserves right to procure the substitute for the defective items from elsewhere at the risk and cost of the supplier and recover from the supplier the extra expenditure, if any incurred by HMT(I). Consignment shall be dispatched only after getting clearance from HMT(I). At least 2 weeks prior intimation regarding readiness of supplies, in all respects must be furnished to HMT(I) for inspection by HMT(I) Quality Assurance Department or by its authorized representative. Complete equipment, standard/special accessories attachments, tooling, etc including packing cases must be offered for inspection. HMT(I) reserves right to inspect the items by HMT(I) and customer representative at supplier's works. The supplies will be inspected by HMTI by deputing HMTI's quality assurance personnel to the vendor's worksite. Inspection and other deputation charges for the deputation of HMTI personnel shall have to be borne by the vendor. Vendors are required to reimburse the Cost of Inspection at 6%of the total order value + Service Tax as applicable.
6	Packing: All Supplies shall be packed in seaworthy wooden cases suitable for shipment by 20ft / 40 ft containers of size (LXBXH): 5900mmx2200mmx2200mm / 12000mmx2200x2200mm respectively. Packing cases must have case-wise detailed packing list to be put inside the cases. Also, 3 copies of casewise packing list to be sent to HMT(I) immediately after packing. All Necessary tools, fixtures, instruments, trail materials, consumables etc., for installation to be sent along with the items. Packing to be made in the presence of HMT(I) inspection engineers.
7	Port of Shipment/ Discharge: Nhava Sheva Port / Port _____, Israel.
8	Freight & Insurance: Supplier to despatch the goods on Freight Prepaid – Door Delivery basis to HMT(I) shipping agent at Nhava Sheva port of shipment. Transit insurance to be arranged by supplier. Supplier to inform HMT(I), despatch details like Lorry receipt No., No. of Packing cases, Gross Weight, Net Weight etc., immediately after dispatch from works.
9	Consignee: Consignee will be intimated later
10	Invoice to : HMT (International) Limited, 59, Bellary Road, Bangalore – 560 032, India TIN NO. 29760097661 A/c. PALESTINE PROJECT, Palestine
11	Price: The price shall be FOR Nhava Sheva Port basis and considered firm and no escalation will be permitted.
12	Payment Terms:
12.1	Payment Terms for supplies: 100% payment for supplies will be payable on 60th day from the date of delivery to our shipping agent at Nhava Sheva. If the Payment terms are not acceptable, the vendors can quote their own payment terms. 18% per annum interest will be loaded to the quoted price for arriving at the total price for price evaluation only as per tender terms. However, the acceptance of the payment terms indicated is at the sole discretion of HMT(I) Management. All bank charges such as L/c opening charges, negotiation charges, etc., are to the account of supplier, if supplier requires payment by inland L/C.
12.2	Payment Terms for Services portion: 100% payment will be made after getting certificate confirming successful Installation and customer Training at site by HMT(I) Engineer stationed at the Site.
13	Penalty for delayed Supply and Services: HMT(I) reserves the right to levy penalty @ 1.0 percent of order value per week of delay beyond the scheduled deliveries / execution of the contract successfully, subject to maximum of 10% of the contract value. HMT(I) reserves the right to cancel the contract in case the delay is more than 10 weeks. The penalties, if any shall be recovered by invoking the Performance Bank Guarantee or withholding the amount out of the payments due.
14	Clearance for Despatch: Equipment shall be dispatched only after getting clearance from HMT(I). Such clearance shall be furnished only after receipt of a certificate from Supplier stating that the snags, if any, pointed out by HMT(I) Engineer/Customer's representative have been duly attended to. HMT(I) shall have the right to hold up the dispatch for want of any

	clearance from the customer. The consignment shall be shipped through a reputed Transporters in a direct truck to reach HMT(I)'s shipping agent with out any transshipment.
15	Name & Address of the Shipping Agent : Will be informed at the time of dispatch clearance by HMT(I).
16	Technical Documents: Supplier to forward the detailed drawings of the all machines / equipment in 3 sets, indicating details about civil work required, Electrical, Pneumatic, Water connection points etc., immediately on receipt of Purchase Order. Instruction / Operating Systems / Spare Parts Manual and other relevant documents pertaining to the Equipment must be in English and should be supplied in (3) three sets as follows : o 2 Sets of Manuals along with the machine / equipment o 1 set Manual to HMT(I), Bangalore o Two copies of Electrical wiring drawings (along with the machine / equipment) o Instructions for commissioning (One copy along with the machine / equipment) and one copy to HMT(I) o Final Test & Inspection Report (along with the machine / equipment)
17	Bought Outs: All the bought-out items such as bearings, belts, electricals, motors, contactors, switches etc., shall correspond to ISI / International Specifications and shall be of reputed make like, SKF, FENNER, SIEMENS & TELEMECHANIC etc.,
18	Rejection & Risk: If, HMT(I) finds that the materials supplied are not of correct quality or not according to the specifications as indicated in the bid offer, then HMT(I) will be entitled to reject the offer
19	Performance Bank Guarantee (PBG): The successful bidder will be required to furnish Performance Bank Guarantee for 10% amount of the Contract value, as per the format attached to this document (Refer Section – V; Annexure – 4). **This bank guarantee shall remain valid for a period of 60 (Sixty) months from the date of successful completion of Erection & Commissioning of the machines/equipment**. If the Bidder is not acceptable to furnish Performance Guarantee 10% of the contract value will be retained as "Retention Money" till the expiry of warranty period of 60 (Sixty) months.
20	5 years International Warranty: The supplies shall be guaranteed against defects of material and workmanship for a period of 60 months from the date of commissioning, Until the expiry of the warranty period, the supplier is obliged to do repairs, modifications, setting right and adjustments considered necessary to guarantee the rated output and to replace any part of the machine / equipment found defective and necessitate replacement due to design, manufacture, and material defect during the warranty period at project site in Palestine. The supplier will arrange for free supply and replace/repair at his cost at site any part that may be found defective and necessitates replacement due to design, manufacture and material defect during warranty period. HMT(I) shall provide airfare, local hospitality to experts deputed during the warranty period as per the mutually agreed terms.
21	5 Years Comprehensive Warranty Maintenance: The successful bidder shall have to enter into a separate Agreement for providing 5 year Comprehensive Warranty Maintenance of the machines/equipment supplied at the Centres for a period of 60 (Sixty) months from the date of successful erection/installation of the machines/equipment.
22	Installation: o The supplier shall depute, the required technical personnel for carrying out installation and providing training to the customers personnel in operation & maintenance of items at project sites in Palestine. o HMT(I) shall arrange to provide, free furnished bachelor's accommodation, local transport and necessary assistance in getting VISA for the Technical Personnel deputed to sites in Palestine. To & Fro Airfare, Boarding expenses, Travel Insurance and incidental expenses to be borne by the supplier. o The supplier shall depute their personnel within 15 days from the date of intimation of readiness at project sites in Palestine. In case the technical personnel extended their period of stay beyond the stipulated/required/agreed time, the additional cost for their extended stay has to be borne by the supplier.
23	Arbitration: All disputes of any kind arising out of supply, acceptance, warranty maintenance etc., shall be referred after issuance of 30 days notice in writing clearly mentioning the nature of dispute to a single arbitrator to be appointed by HMT(I). The venue for arbitration shall be Bangalore.

SECTION III: SPECIAL CONDITIONS OF CONTRACT (SCC)	
24	Jurisdiction: The disputes, legal matters, court matters, if any shall be subject to Bangalore jurisdiction only.
25	Force Majeure: HMT(I) may consider relaxing the penalty and delivery requirements, as specified in this document, if and to the extent that, the delay in performance or other failure to perform its obligations under the Contract is the result of a Force Majeure. Force Majeure is defined as an event of effect that cannot reasonably be anticipated such as acts of God (like earthquakes, floods, storms etc.), acts of states, the direct and indirect consequences of wars (declared or undeclared), hostilities, national emergencies, civil commotion and strikes at successful Bidder's premises. Either party shall be excused from performance of their obligation during or to the extent that performance is prevented by the occurrence of unforeseen causes beyond the control of and without the negligence of the party claiming excuse. Such causes shall include, without limitation, strike, go slow , other concerted acts of workmen, lockout, Act of God, war, fire, explosion, action of elements, flood, epidemic, riot, sabotage, embargo, blockade, civil disturbance and Governmental restrictions or limitations etc. The party claiming excuse shall give immediate written notice thereof to the other, in any case not later that 15 (fifteen) days, following the occurrence of such event. If performance is held for a continuous period of more than 3 (three) months from the date of first notice, then the parties shall review the situation and agree upon any course of action so as to protect the interest of both.

End of Section - III

SECTION – IV: SCHEDULE OF REQUIREMENTS / SCOPE OF SUPPLIES (SR)

Schedule of Requirements / Scope of Supplies is as detailed below

LOT – 1 Autotronic Equipment

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University (PPU), Hebron, Palestine.					
Sl. No.	**Annex. Ref.**	**Description**	**Brief Specification**	**Qty In Nos.**	**Remarks / Deviations**
1	1/2 of Annex VII	Fully operational Multi Point Injection Petrol Engine	Complete with Fuel, Ignition, Cooling, Exhaust Systems, Starting and Charging System.	1	
2	2/2 of Annex VII	Fully Operational Single Point Injection Petrol Engine	Complete with Fuel, Ignition, Cooling and Exhaust Systems.	1	
3	3/2 of Annex VII	Fully operational Diesel Engine	Cooling, Turbo and Exhaust Systems, Starting and Charging System – (Volkswagen 1.9 Turbo Diesel Engine Complete with BOSCH Electronic Diesel Control System, fitted with manufactures Diagnostic socket 16Pin)	1	
4	4/2 of Annex VII	Fully operational Diesel Engine,	complete with Fuel, Cooling, Turbo and Exhaust System, Starting and Charging system – (Common Rail Turbo Diesel Engine, Complete Bosch or Siemens Electronic Diesel Control System fitted with manufactures Diagnostic socket 16Pin**)**	1	
5	6/2 of Annex VII	Sets of all sensors and actuators	Used for modern Engines.	2	
6	7/2 of Annex VII	Simulation of Central Door Locking	With Alarm system and power windows including real working on car door**.**	1	
7	8/2 of Annex VII	Complete Set of Alarm System		1	
8	9/2 of Annex VII	Complete set of ABS Components		1	
9	10/2 of Annex VII	Complete set of Airbag Components		1	
10	11/2 of Annex VII	Air Compressor	Reciprocating	1	
11	12/2 of Annex VII	Hand held Diagnostic Tester		1	
12	13/2 of Annex VII	Wireless Diagnostic tester include Laptop		1	
13	14/2 of Annex VII	Fully operational ESP Trainer.	Complete with braking circuit and manufactured using original vehicle components. Simulation of wheel lock to active the ABS. pressure gauges indicate individual front and rear line pressures at each wheel. Brake pedal kick back cab be observed. Diagnostic socket fitted for the connection of fault code readers	1	
14	15/2 of Annex VII	Fully operated automotive automatic Air Condition System Simulator		1	
15	16/2 of Annex VII	Automotive special Multi Meter		1	

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University (PPU), Hebron, Palestine.					
Sl. No.	**Annex. Ref.**	**Description**	**Brief Specification**	**Qty In Nos.**	**Remarks / Deviations**
16	17/2 of Annex VII	3D wheel Alignment		1	
17	18/2 of Annex VII	4 Gas Analyzer		1	
18	19/2 of Annex VII	Common Rail Injector Tester		1	
19	20/2 of Annex VII	Lift for wheel Alignment		1	
20	21/2 of Annex VII	Fully operated steering system with all component		1	
21	22/2 of Annex VII	Fully Automatic 'AIRCO' service center with integrated		1	
22	23/2 of Annex VII	Sensors Simulator		1	
23	24/2 of Annex VII	Eprom reader		1	
24	25/2of Annex VII	Immobilizer Key Programmer		1	
25	26/2of Annex VII	Electrical Test Bench		1	
26	27/2of Annex VII	Sparkplug cleaner & Tester		1	
27	28/2 of Annex VII	Garage Jack, Hydraulic	Cap 2.5 ton	1	
28	31/2 of Annex VII	Mechanical/Hydraulic Hoist	Platform type 3T	1	
29	32/2 of Annex VII	Steel creeper	1030 x 415 x 160 mm	10	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - I					

LOT - 2 Machine Tools

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta Palestine Polytechnic University (PPU), Hebron, Palestine					
Sl. No.	**Annex. Ref.**	**Description**	**Brief Specification**	**Qty In Nos.**	**Remarks / Deviations**
1	100/2, 6/3, 28/4 of Annex 2 & 30/2 of Annex VII	Pillar Drilling M/c	Capacity 25 mm	7	
2	101/2, 3/3, 29/4 of Annex 2 & 29/2 of Annex VII	Pedestal Grinder	Wheel dia 200 mm	7	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - II					

LOT - 3 Refrigeration & Air-conditioning Trainer Equipment

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No.	**Annex. Ref.**	**Description**	**Brief Specification**	**Qty In Nos.**	**Remarks / Deviations**
1	1/2 of Annex II	Refrigeration Test Rig		1	
2	2/2 of Annex II	Walking Cooler, Capacity	3000K cal/hr	1	
3	3/2 of Annex II	Condensing Unit with hermetic compressor	Cap.500 Kcal/hr	1	
4	4/2 of Annex II	Cut section model: open, semi-sealed and sealed compressor	(Set of 3)	1	
5	5/2 of Annex II	Heat Exchanger Shell & tube type		1	
6	6/2 of Annex II	Heat Exchanger tube in tube type		1	
7	7/2 of Annex II	Refrigeration tutor		1	
8	8/2 of Annex II	Package Air conditioner		1	
9	9/2 of Annex II	Automobile Air Conditioner Trainer	Cap. 1 Ton	1	
10	10/2 of Annex II	Split type Air conditioner trainer		1	
11	11/2 of Annex II	Air conditioner tutor	1.25 T	1	
12	12/2 of Annex II	Room Air conditioner tutor/test rig		1	
13	124/2 of Annex II	Evacuating & Refrigerant charging station comprising a) Rotary two stage vacuum pump and motor (With gas ballast & anti such back) Manifold with gauges valves and capable of pulling vacuum upto 50 microns of Hg and with provision of connecting to a mic. b) Graduated charging cylinder with provisions for temperature correction and all necessary isolating valves. II. Evacuating & charging station as above but fitted with weighing scale (upto 2 Kg in lieu of (b) above and with accuracy of +/-1 gram for c		1	
14	126/2 of Annex II	Two stage rotary vacuum pump of capacity approx 60-100 1pm capable of evacuating to 50 microns of Hg and fitted with gas ballast anti suck valve and single phase motor.		1	
15	137/2 of Annex II	Window air conditioning	Capacity 3000 K.cal/hr.	1	
16	141/2 of Annex II	Ice Candy unit complete with stainless steel tank mould box thermocole insulated sun mica body agitator compressor motor etc. Temperature pressure refrigerant control gauges motor pipe fitting etc. 3000 K.Cal/hr or working model simulator.		1	
17	142/2 of Annex II	Air conditioning plant direct and indirect water chiller complete with all controls etc. Capacity 15000 K. cal/hr or working trainer model/simulator, Alternatively a		1	

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No.	**Annex. Ref.**	**Description**	**Brief Specification**	**Qty In Nos.**	**Remarks / Deviations**
		packaged Air conditioner of similar			
18	143/2 of Annex II	Condensing unit with open type compressor air cooled condenser controls etc.	Capacity 3000 K. cal/hr	1	
19	144/2 of Annex II	Condensing unit with open type compressor evaporator condenser controls etc	Capacity 3000 K.cal/hr	1	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE – III					

LOT - 4 Refrigeration & Air-conditioning Tools & Equipment

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty In Nos.**	**Remarks / Deviation**
1	1/156	134A Refrigerant in cylinders with valves		2	
2	1/191	Accessories thormostatic expansion valve distributors, driers, (pencil solid core type etc.) accumulators, receivers, bellows type thermostat, HP Stat & LP Stat humidi stat, solenoid valves		1	
3	1/179	Acid test kit		1	
4	1/127	Anemometer (Vane Type)		1	
5	1/185	Ball Valves service valves hand shut valves		2	
6	1/182	Brazing alloy rods for 1/4" to 7/8" tubes Cu to cu, Cu to steel, Cu to brass and appropriate fluxes		1	
7	1/174	Circulating water pump		1	
8	1/170	Components of Car AC systems. a) Wobble plate compressor with mounting brackets. b) Serpentine evaporator. c) Parallel flow condenser. d) Hoses, tubes, receive, expansion valve. e) Electrical components & wiring harness		1	
9	1/38	Compound gauge diameter 63 mm with recalibration set screw scale vacuum 76 mm pressure 15 Kg/Sq.cm		4	
10	1/187	Compressor tester for small hermetic compressor		1	
11	1/171	Condenser - Shell and tube		1	
12	1/138	Cooler- bottle	110 litre 1/6HP	1	
13	1/193	Cooler-Visi		1	
14	1/140	Cooler-water	Storage Type	1	
15	1/139	Cooler-water	Instantaneous type	1	
16	1/136	Deep freezer	165 litre, -18 deg C1/4HP	1	
17	1/125	Dial thermometer remote controls armoured capillary dial 75 mm-50		2	
18	1/164	Dry N2 in cylinder with 2 stage regulator or commercial N2 in cylinder with drier unit and 2 stage regulator		1	
19	1/192	Electrical accessories current & potential relays start & run capacitors, PTC,s overload protector relays contractor.		1	
20	1/189	Evaporator of direct cooled refrigerator with capillary heat exchanger		1	
21	1/190	Evaporator of Frost free refrigerator		1	
22	1/172	Fan coil unit with water valves		1	
23	1/168	Filter driers for CFC-12 & HFC-134 A for repairs retrofits		8	
24	1/154	Fin straightener / Fin comb		42	
25	1/14	Flaring tool set with Swedging		4	
26	1/167	Four way manifold with gauges		1	
27	1/41	Gas leak detector for halogen gas		1	

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
28	1/155	HC refrigerant in cylinder/ disposable containers		2	
29	1/188	Hermetic compressor		1	
30	1/184	i) Hermetic compressor		2	
		ii) Hermetic compressor		3	
31	1/161	No frost refrigerator 300 litre capacity using HC refrigerant		1	
32	1/183	Pilot tube & inclined tube manometer		1	
33	1/163	Portable Air-LPG brazing kit with 2 Kg LPG cylinder, torches, houses, standard make.a) With straight flame. b) With Cyclone / swirl jet flame.		1	
34	1/132	Pressure testing tank with lighting arrangement pressure gauge (0-35 Kg / sq.cm) double stage		1	
35	1/186	Quick couplers process tube adaptor		2	
36	1/145	Refrigeration system with provision of capacity control etc, for demonstration		1	
37	1/157	Recovery unit one each for CFC & R134 A refrigerants with recovering cylinders.		1	
38	1/194	Recycling Unit		1	
39	1/180	Refractometer		1	
40	1/160	Refrigerator 170 litre using 134 A refrigerant		1	
41	1/134	Refrigerator compressor type		1	
42	1/135	Refrigerator compressor type		1	
43	1/158	Reverse cycle AC/Heat pump		1	
44	1/169	Sealed ex-proof components for use in HC appliances: Thermostats Sealed OLPS solid state PTC's door switches lamp holders		4	
45	1/173	Shell and tube DX chillers (Small)		1	
46	1/159	Split type AC 4500 K.cal/hr		1	
47	1/165	Trichlorethylene bottle		1	
48	1/166	Two way manifold with gauges		1	
49	1/122	Refrigerant cylinder		2	
50	1/123	Refrigerant cylinder		2	
51	1/120	Feeler gauge		1	
52	1/133	Heating Kit with infra red bulb		1	
53	1/152	Micron vacuum gauge		2	
54	1/37	Pressure gauge diameter 63 mm with recalibration set screw scale vacuum 76 mm pressure		4	
55	1/178	Schraeder valve core removal tool		1	
56	1/44	Scissor gasket cutting stainless steel		4	
57	1/153	Sensor thermometer		2	
58	1/39	Serviceman thermometer in metal case		2	
59	1/131	Spray outfit "V" twin with motor 1/2 HP delivery upto 120 Litre free air pressure upto 3 Kg/Sq.cm with spray gun and fitting		1	
60	1/15	Swedging tool		4	
61	1/16	Swedging tool		1	
62	1/22	Capillary plug gauge		2	
63	1/35	Valve key-T-Handle		4	
64	1/40	Sling psychrometer mounted on aluminum / plastic back scale –50 Deg. C to + 50 Deg.C		1	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - IV					

LOT - 5 Electrical Machine Trainers:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Remarks / Deviation**
1	Encl-4/1, A-II	Electrical Machine Trainer		1	
1.1		Work Table for Electrical Machine Trainer		1	
2.	Encl-4/2, A-II	Industrial Control Trainer		1	
2.2		Worktable for Industrial Control Trainer		1	
3.	Encl-4/3, A-II	3 Phase AC Motor Fault Simulator		1	
3.1		Work Table for 3 Phase AC Motor Fault Simulator		1	
4	Encl-4/4, A-II	House Wiring /Commercial wiring Installation Trainer		1	
4.1		House Wiring /Commercial wiring Installation Trainer		1	
5	Encl-4/5, A-II	Electrical Control Trainer		1	
5.1		Work Table for Electrical Control Trainer		1	
6	Encl-4/6, A-II	Electrical Trainer		1	
6.1		Work Table for Electrical Trainer		1	
7	Encl-4/7, A-II	3-Phase Induction Motor Speed Control Trainer		1	
7.1		Work Table for 3-Phase Induction Motor Speed Control Trainer		1	
8	Encl-4/8, A-II	3-Phase Induction Motor Fault Simulator		1	
8.1		Work Table for 3-Phase Induction Motor Fault Simulator		1	
9	Encl-4/10, A-II	Stepper motor		1	
9.1		Work Table for Stepper motor		1	
10	Encl-4/137, A-II	Test Bench	Electrical	3	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - V					

LOT - 6 Electronic Trainers

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Remarks / Deviation**
1	Encl-4/12, A-II	Oscilloscope - Digital		4	
2	Encl-4/15, A-II	Function Generator		1	
3	Encl-4/16, A-II	Discrete Component trainer		1	
4	Encl-4/17, A-II	Linear I.C. Trainer		1	
5	Encl-4/18, A-II	Digital I.C Trainer		1	
6	Encl-4/97, A-II	Inverter, sine wave		2	
7	Encl-4/148, A-II	Pattern generator with all accessories		1	
8	Encl-4/150, A-II	Colour TV Receiver (PAL) with Service Manual		1	
9	Encl-4/151, A-II	Colour TV Receiver – Three System with Service Manual		6	
10	Encl-4/152, A-II	Trainer Kit- Six in demonstration		2	
11	Encl-4/153,A-II	DTMF Telephone Trainer		2	
12	Encl-4/154, A-II	Micro Processor Training kit		16	
13	Encl-4/155, A-II	Digital Counter with all accessories		2	
14	Encl-2/117, A-II	Transistor Tester		1	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - VI					

LOT - 7 Electrical Panels

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Remarks / Deviation**
1	Encl-4/24, A-II	E.L.C.B	Range: 5KVA	1	
2	Encl-4/25, A-II	R.C.C.B	Range: 5KVA	1	
3	Encl-4/26, A-II	M.C.C.B	Range: 5KVA	1	
4	Encl-4/123, A-II	Cut Section models of Motors		1 set	
5	Encl-4/134, A-II	Single phase preventer		1	
6	Encl-4/135, A-II	Earth Leakage Switch		1	
7	Encl-4/90, A-II	Contactor		1	
8	Encl-4/91, A-II	Contactor		1	
9	Encl-4/94, A-II	Knife switch		4	
10	Encl-4/95, A-II	Knife switch		4	
11	Encl-4/92, A-II	Limit Switch - Set		1set	
12	Encl-4/93, A-II	Rotary switch set		2 sets	
13	Encl-4/89, A-II	Relays - set		1	
14	Encl-4/110, A-II	Relays - set		1	
15	Encl-4/111, A-II	Starters for 3 Phase, 380V, 50 cycles, A.C. motors - Set		1 Set	
16	Encl-2/111, A-II	Variac		1	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - VII					

LOT - 8 Electrical Items

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Remarks / Deviation**
1	Encl-4/27, A-II	M.C.B		2 Sets	
2	Encl-4/68, A-II	Analog multi Meter		4	
3	Encl-4/69, A-II	Digital Multi meter		8	
4	Encl-4/70, A-II	A.C. Voltmeter, MI		2	
5	Encl-4/71, A-II	Milli Voltmeter centre zero		2	
6	Encl-4/72, A-II	D.C Milli ammeter		2	
7	Encl-4/73, A-II	D.C. Ammeter MC		2	
8	Encl-4/74, A-II	Ammeter MC		2	
9	Encl-4/75, A-II	Ammeter MC		2	
10	Encl-4/76, A-II	A.C. Ammeter MI		2	
11	Encl-4/77, A-II	A.C. Ammeter MI		2	
12	Encl-4/78, A-II	K.W. Meter		2	
13	Encl-4/79, A-II	A.C. Energy Meter		2	
14	Encl-4/80, A-II	Single Phase power factor meter		2	
15	Encl-4/81, A-II	Frequency Meter		2	
16	Encl-4/83, A-II	Current transformer		2	
17	Encl-4/84, A-II	Potential Transformer		2 Sets	
18	Encl-4/86, A-II	Tong tester/ Clamp meter		2	
19	Encl-4/87, A-II	Megger set		2 sets	
20	Encl-4/88, A-II	Wheat stone bridge		2	
21	Encl-4/96, A-II	DC power supply		3	
22	Encl-4/98, A-II	Servo Voltage Stabilizer		2	
23	Encl-4/108, A-II	Flux meter		2	
24	Encl-4/109, A-II	Lux meter		2	
25	Encl-4/128, A-II	Auto transformer		1	
26	Encl-4/138, A-II	Clamp on Ammeter		3	
27	Encl-4/142, A-II	Earth Resistance Tester		2	
28	Encl-4/147, A-II	Stabilized low voltage power supply		1	
29	Encl-4/149, A-II	High Voltage Probe with meter		4	
30	Encl-4/157, A-II	Mini drill machine for P.C.B's		1	
31	Encl-4/163, A-II	Degaussing coil		2	
32	Encl-4/165, A-II	Motor Winding Set	FHP AC motor set	1	
			FHP DC motor set	1	
33	Encl-4/168, A-II	Electronic Flasher		1	
34	Encl-2/108, A-II	Ammeter AC/DC		5	
				5	
35	Encl-2/110, A-II	Megger		1	
36	Encl-2/112, A-II	Wattmeter multi range up to 1KW		1	
37	Encl-2/113, A-II	Wattmeter multi range up to 5KW		1	
38	Encl-2/118, A-II	RLC Bridge		1	
FOR DETAILED TECHNICAL SPECIFICATIONS REFER ENCLOSURE - VIII					

End of Section – IV

SECTION V– COMMERCIAL

Annexure – 1

PRICE SCHEDULE

LOT – 1 Autotronics Equipment

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University (PPU) Hebron, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	1/2 of Annex VII	Fully operational Multi Point Injection Petrol Engine	Complete with Fuel, Ignition, Cooling, Exhaust Systems, Starting and Charging System.	1		
2	2/2 of Annex VII	Fully Operational Single Point Injection Petrol Engine	Complete with Fuel, Ignition, Cooling and Exhaust Systems.	1		
3	3/2 of Annex VII	Fully operational Diesel Engine	Cooling, Turbo and Exhaust Systems, Starting and Charging System – (Volkswagen 1.9 Turbo Diesel Engine Complete with BOSCH Electronic Diesel Control System, fitted with manufactures Diagnostic socket 16Pin)	1		
4	4/2 of Annex VII	Fully operational Diesel Engine,	complete with Fuel, Cooling, Turbo and Exhaust System, Starting and Charging system – (Common Rail Turbo Diesel Engine, Complete Bosch or Siemens Electronic Diesel Control System fitted with manufactures Diagnostic socket 16Pin**)**	1		
5	6/2 of Annex VII	Sets of all sensors and actuators	Used for modern Engines.	2		
6	7/2 of Annex VII	Simulation of Central Door Locking	With Alarm system and power windows including real working on car door**.**	1		
7	8/2 of Annex VII	Complete Set of Alarm System		1		
8	9/2 of Annex VII	Complete set of ABS Components		1		
9	10/2 of Annex VII	Complete set of Airbag Components		1		
10	11/2 of Annex VII	Air Compressor	Reciprocating	1		
11	12/2 of Annex VII	Hand held Diagnostic Tester		1		
12	13/2 of Annex VII	Wireless Diagnostic tester include Laptop		1		
13	14/2 of Annex VII	Fully operational ESP Trainer.	Complete with braking circuit and manufactured using original vehicle components. Simulation of	1		

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University (PPU) Hebron, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
			wheel lock to active the ABS. pressure gauges indicate individual front and rear line pressures at each wheel. Brake pedal kick back cab be observed. Diagnostic socket fitted for the connection of fault code readers			
14	15/2 of Annex VII	Fully operated automotive automatic Air Condition System Simulator		1		
15	16/2 of Annex VII	Automotive special Multi Meter		1		
16	17/2 of Annex VII	3D wheel Alignment		1		
17	18/2 of Annex VII	4 Gas Analyzer		1		
18	19/2 of Annex VII	Common Rail Injector Tester		1		
19	20/2 of Annex VII	Lift for wheel Alignment		1		
20	21/2 of Annex VII	Fully operated steering system with all component		1		
21	22/2 of Annex VII	Fully Automatic 'AIRCO' service center with integrated		1		
22	23/2 of Annex VII	Sensors Simulator		1		
23	24/2 of Annex VII	Eprom reader		1		
24	25/2of Annex VII	Immobilizer Key Programmer		1		
25	26/2of Annex VII	Electrical Test Bench		1		
26	27/2of Annex VII	Sparkplug cleaner & Tester		1		
27	28/2 of Annex VII	Garage Jack, Hydraulic	Cap 2.5 ton	1		
28	31/2 of Annex VII	Mechanical/Hydraulic Hoist	Platform type 3T	1		
29	32/2 of Annex VII	Steel creeper	1030 x 415 x 160 mm	10		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Cost towards Installation, Commissioning and training the customer's personnel in operation and maintenance for above machines at project site in Palestine:						
***Total Indian Rupees (in words)**						

***Total should include the cost towards the following:**

a. Deputation of technical personnel for carrying out installation, commissioning, trials, training the customer's personnel in operation and maintenance of above equipment at project site in Palestine.
b. Necessary tools, fixtures, instruments, trial materials, consumables, etc, for Installation and training have to be sent along with the supplies.

Please indicate the man day rates considered for deputation on the format given below

Sl No.	No. of Persons required for Installation, Commissioning and Training of LOT 1 equipment	No. of Man days required	Cost per man day (In Rs.)

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

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4. VALUES should be both in figures and Words.
5. **The prices quoted should be most competitive**

LOT - 2 Machine Tools

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta Plastic Processing Unit, Hebron, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	100/2, 6/3, 28/4 of Annex 2 & 30/2 of Annex VII	Pillar Drilling M/c	Capacity 25 mm	7		
2	101/2, 3/3, 29/4 of Annex 2 & 29/2 of Annex VII	Pedestal Grinder	Wheel dia 200 mm	7		
Total FOR Nhavasheva Prices in Indian Rupees						
Cost towards Installation, Commissioning and training the customer's personnel in operation and maintenance for above machines at project site in Palestine						
***Total Indian Rupees (in words)**						

***Total should include the cost towards the following:**

a. Deputation of technical personnel for carrying out installation, commissioning, trials, training the customer's personnel in operation and maintenance of above equipment at project site in Palestine.
b. Necessary tools, fixtures, instruments, trial materials, consumables, etc, for Installation and training have to be sent along with the supplies.

Please indicate the man day rates considered for deputation on the format given below

Sl No.	No. of Persons required for Installation, Commissioning and Training of LOT 2 equipment	No. of Man days required	Cost per man day (In Rs.)

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

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7. No erasures or alternations in the text of the offer are permitted.
8. Any correction made in offer shall be initialed by the Bidder.
9. VALUES should be both in figures and Words.
10. **The prices quoted should be most competitive**

LOT - 3 Refrigeration & Air-conditioning Trainer Equipment

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	1/2 of Annex II	Refrigeration Test Rig		1		
2	2/2 of Annex II	Walking Cooler, Capacity	3000K cal/hr	1		
3	3/2 of Annex II	Condensing Unit with hermetic compressor	Cap.500 Kcal/hr	1		
4	4/2 of Annex II	Cut section model: open, semi-sealed and sealed compressor	(Set of 3)	1		
5	5/2 of Annex II	Heat Exchanger Shell & tube type		1		
6	6/2 of Annex II	Heat Exchanger tube in tube type		1		
7	7/2 of Annex II	Refrigeration tutor		1		
8	8/2 of Annex II	Package Air conditioner		1		
9	9/2 of Annex II	Automobile Air Conditioner Trainer	Cap. 1 Ton	1		
10	10/2 of Annex II	Split type Air conditioner trainer		1		
11	11/2 of Annex II	Air conditioner tutor	1.25 T	1		
12	12/2 of Annex II	Room Air conditioner tutor/test rig		1		
13	124/2 of Annex II	Evacuating & Refrigerant charging station comprising a) Rotary two stage vacuum pump and motor (With gas ballast & anti such back) Manifold with gauges valves and capable of pulling vacuum upto 50 microns of Hg and with provision of connecting to a mic. b) Graduated charging cylinder with provisions for temperature correction and all necessary isolating valves. II. Evacuating & charging station as above but fitted with weighing scale (upto 2 Kg in lieu of (b) above and with accuracy of +/-1 gram for c		1		
14	126/2 of Annex II	Two stage rotary vacuum pump of capacity approx 60-100 1pm capable of evacuating to 50 microns of Hg and fitted with gas ballast anti suck valve and single phase motor.		1		
15	137/2 of Annex II	Window air conditioning	Capacity 3000 K.cal/hr.	1		

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
16	141/2 of Annex II	Ice Candy unit complete with stainless steel tank mould box thermocole insulated sun mica body agitator compressor motor etc. Temperature pressure refrigerant control gauges motor pipe fitting etc. 3000 K.Cal/hr or working model simulator.		1		
17	142/2 of Annex II	Air conditioning plant direct and indirect water chiller complete with all controls etc. Capacity 15000 K. cal/hr or working trainer model/simulator, Alternatively a packaged Air conditioner of similar		1		
18	143/2 of Annex II	Condensing unit with open type compressor air cooled condenser controls etc.	Capacity 3000 K. cal/hr	1		
19	144/2 of Annex II	Condensing unit with open type compressor evaporator condenser controls etc	Capacity 3000 K.cal/hr	1		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Cost towards Installation, Commissioning and training the customer's personnel in operation and maintenance for above Equipment at project site in Palestine.						
***Total Indian Rupees (in words)**						

***Total should include the cost towards the following:**

a. Deputation of technical personnel for carrying out installation, commissioning, trials, training the customer's personnel in operation and maintenance of above equipment at project site in Palestine.
b. Necessary tools, fixtures, instruments, trial materials, consumables, etc, for Installation and training have to be sent along with the supplies.

Please indicate the man day rates considered for deputation on the format given below

Sl No.	No. of Persons required for Installation, Commissioning & Training of LOT 3 equipment	No. of Man days required	Cost per man day (In Rs.)

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

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5. **The prices quoted should be most competitive**

LOT - 4 Refrigeration & Air-conditioning Tools & Equipment

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	1/156	134A Refrigerant in cylinders with valves		2		
2	1/191	Accessories thermostatic expansion valve distributors, driers, (pencil solid core type etc.) accumulators, receivers, bellows type thermostat, HP Stat & LP Stat humidi stat, solenoid valves		1		
3	1/179	Acid test kit		1		
4	1/127	Anemometer (Vane Type)		1		
5	1/185	Ball Valves service valves hand shut valves		2		
6	1/182	Brazing alloy rods for 1/4" to 7/8" tubes Cu to cu, Cu to steel, Cu to brass and appropriate fluxes		1		
7	1/174	Circulating water pump		1		
8	1/170	Components of Car AC systems. a) Wobble plate compressor with mounting brackets. b) Serpentine evaporator. c) Parallel flow condenser. d) Hoses, tubes, receive, expansion valve. e) Electrical components & wiring harness		1		
9	1/38	Compound gauge diameter 63 mm with recalibration set screw scale vacuum 76 mm pressure 15 Kg/Sq.cm		4		
10	1/187	Compressor tester for small hermetic compressor		1		
11	1/171	Condenser - Shell and tube		1		
12	1/138	Cooler- bottle	110 litre 1/6HP	1		
13	1/193	Cooler-Visi		1		
14	1/140	Cooler-water	Storage Type	1		
15	1/139	Cooler-water	Instantaneous type	1		
16	1/136	Deep freezer	165 litre, -18 deg C1/4HP	1		
17	1/125	Dial thermometer remote controls armoured capillary dial 75 mm-50		2		
18	1/164	Dry N2 in cylinder with 2 stage regulator or commercial N2 in cylinder with drier unit and 2 stage regulator		1		
19	1/192	Electrical accessories current & potential relays start & run capacitors, PTC,s overload protector relays contractor.		1		
20	1/189	Evaporator of direct cooled refrigerator with capillary heat exchanger		1		

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
21	1/190	Evaporator of Frost free refrigerator		1		
22	1/172	Fan coil unit with water valves		1		
23	1/168	Filter driers for CFC-12 & HFC-134 A for repairs retrofits		8		
24	1/154	Fin straightener / Fin comb		42		
25	1/14	Flaring tool set with Swedging		4		
26	1/167	Four way manifold with gauges		1		
27	1/41	Gas leak detector for halogen gas		1		
28	1/155	HC refrigerant in cylinder/ disposable containers		2		
29	1/188	Hermetic compressor		1		
30	1/184	i) Hermetic compressor		2		
		ii) Hermetic compressor		3		
31	1/161	No frost refrigerator 300 litre capacity using HC refrigerant		1		
32	1/183	Pilot tube & inclined tube manometer		1		
33	1/163	Portable Air-LPG brazing kit with 2 Kg LPG cylinder, torches, houses, standard make.a) With straight flame. b) With Cyclone / swirl jet flame.		1		
34	1/132	Pressure testing tank with lighting arrangement pressure gauge (0-35 Kg / sq.cm) double stage		1		
35	1/186	Quick couplers process tube adaptor		2		
36	1/145	Refrigeration system with provision of capacity control etc, for demonstration		1		
37	1/157	Recovery unit one each for CFC & R134 A refrigerants with recovering cylinders.		1		
38	1/194	Recycling Unit		1		
39	1/180	Refractometer		1		
40	1/160	Refrigerator 170 litre using 134 A refrigerant		1		
41	1/134	Refrigerator compressor type		1		
42	1/135	Refrigerator compressor type		1		
43	1/158	Reverse cycle AC/Heat pump		1		
44	1/169	Sealed ex-proof components for use in HC appliances: Thermostats Sealed OLPS solid state PTC's door switches lamp holders		4		
45	1/173	Shell and tube DX chillers (Small)		1		
46	1/159	Split type AC 4500 K.cal/hr		1		
47	1/165	Trichlorethylene bottle		1		
48	1/166	Two way manifold with gauges		1		
49	1/122	Refrigerant cylinder		2		
50	1/123	Refrigerant cylinder		2		
51	1/120	Feeler gauge		1		
52	1/133	Heating Kit with infra red bulb		1		

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
53	1/152	Micron vacuum gauge		2		
54	1/37	Pressure gauge diameter 63 mm with recalibration set screw scale vacuum 76 mm pressure		4		
55	1/178	Schraeder valve core removal tool		1		
56	1/44	Scissor gasket cutting stainless steel		4		
57	1/153	Sensor thermometer		2		
58	1/39	Serviceman thermometer in metal case		2		
59	1/131	Spray outfit "V" twin with motor 1/2 HP delivery upto 120 Litre free air pressure upto 3 Kg/Sq.cm with spray gun and fitting		1		
60	1/15	Swedging tool		4		
61	1/16	Swedging tool		1		
62	1/22	Capillary plug gauge		2		
63	1/35	Valve key-T-Handle		4		
64	1/40	Sling psychrometer mounted on aluminum / plastic back scale –50 Deg. C to + 50 Deg.C		1		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Total Indian Rupees (in words)						

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

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5. **The prices quoted should be most competitive**

LOT - 5 Electrical Machine Trainers:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	Encl-4/1, A-II	Electrical Machine Trainer		1		
1.1		Work Table for Electrical Machine Trainer		1		
2.	Encl-4/2, A-II	Industrial Control Trainer		1		
2.2		Worktable for Industrial Control Trainer		1		
3.	Encl-4/3, A-II	3 Phase AC Motor Fault Simulator		1		
3.1		Work Table for 3 Phase AC Motor Fault Simulator		1		
4	Encl-4/4, A-II	House Wiring /Commercial wiring Installation Trainer		1		
4.1		House Wiring /Commercial wiring Installation Trainer		1		
5	Encl-4/5, A-II	Electrical Control Trainer		1		
5.1		Work Table for Electrical Control Trainer		1		
6	Encl-4/6, A-II	Electrical Trainer		1		
6.1		Work Table for Electrical Trainer		1		
7	Encl-4/7, A-II	3-Phase Induction Motor Speed Control Trainer		1		
7.1		Work Table for 3-Phase Induction Motor Speed Control Trainer		1		
8	Encl-4/8, A-II	3-Phase Induction Motor Fault Simulator		1		
8.1		Work Table for 3-Phase Induction Motor Fault Simulator		1		
9	Encl-4/10, A-II	Stepper motor		1		
9.1		Work Table for Stepper motor		1		
10	Encl-4/137, A-II	Test Bench	Electrical	3		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Cost towards Installation, Commissioning and training the customer's personnel in operation and maintenance for above Equipment at project site in Palestine.						
***Total Indian Rupees (in words)**						

***Total should include the cost towards the following:**

a. Deputation of technical personnel for carrying out installation, commissioning, trials, training the customer's personnel in operation and maintenance of above equipment at project site in Palestine.
b. Necessary tools, fixtures, instruments, trial materials, consumables, etc, for Installation and training have to be sent along with the supplies.

Please indicate the man day rates considered for deputation on the format given below

Sl No.	No. of Persons required for Installation, Commissioning & Training of LOT 5 equipment	No. of Man days required	Cost per man day (In Rs.)

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

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5. **The prices quoted should be most competitive**

LOT - 6 Electronic Trainers:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	Encl-4/12, A-II	Oscilloscope - Digital		4		
2	Encl-4/15, A-II	Function Generator		1		
3	Encl-4/16, A-II	Discrete Component trainer		1		
4	Encl-4/17, A-II	Linear I.C. Trainer		1		
5	Encl-4/18, A-II	Digital I.C Trainer		1		
6	Encl-4/97, A-II	Inverter, sine wave		2		
7	Encl-4/148, A-II	Pattern generator with all accessories		1		
8	Encl-4/150, A-II	Colour TV Receiver (PAL) with Service Manual		1		
9	Encl-4/151, A-II	Colour TV Receiver – Three System with Service Manual		6		
10	Encl-4/152, A-II	Trainer Kit- Six in demonstration		2		
11	Encl-4/153,A-II	DTMF Telephone Trainer		2		
12	Encl-4/154, A-II	Micro Processor Training kit		16		
13	Encl-4/155, A-II	Digital Counter with all accessories		2		
14	Encl-2/117, A-II	Transistor Tester		1		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Cost towards Installation, Commissioning and training the customer's personnel in operation and maintenance for above Equipment at project site in Palestine.						
***Total Indian Rupees (in words)**						

***Total should include the cost towards the following:**

a. Deputation of technical personnel for carrying out installation, commissioning, trials, training the customer's personnel in operation and maintenance of above equipment at project site in Palestine.
b. Necessary tools, fixtures, instruments, trial materials, consumables, etc, for Installation and training have to be sent along with the supplies.

Please indicate the man day rates considered for deputation on the format given below

Sl No.	No. of Persons required for Installation, Commissioning & Training of LOT 6 equipment	No. of Man days required	Cost per man day (In Rs.)

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

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4. VALUES should be both in figures and Words.
5. **The prices quoted should be most competitive**

LOT - 7 Electrical Panels:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	Encl-4/24, A-II	E.L.C.B	Range: 5KVA	1		
2	Encl-4/25, A-II	R.C.C.B	Range: 5KVA	1		
3	Encl-4/26, A-II	M.C.C.B	Range: 5KVA	1		
4	Encl-4/123, A-II	Cut Section models of Motors		1 set		
5	Encl-4/134, A-II	Single phase preventer		1		
6	Encl-4/135, A-II	Earth Leakage Switch		1		
7	Encl-4/90, A-II	Contactor		1		
8	Encl-4/91, A-II	Contactor		1		
9	Encl-4/94, A-II	Knife switch		4		
10	Encl-4/95, A-II	Knife switch		4		
11	Encl-4/92, A-II	Limit Switch - Set		1set		
12	Encl-4/93, A-II	Rotary switch set		2 sets		
13	Encl-4/89, A-II	Relays - set		1		
14	Encl-4/110, A-II	Relays - set		1		
15	Encl-4/111, A-II	Starters for 3 Phase, 380V, 50 cycles, A.C. motors - Set		1 Set		
16	Encl-2/111, A-II	Variac		1		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Total Indian Rupees (in words)						

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

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5. **The prices quoted should be most competitive**

LOT - 8 Electrical Items:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
1	Encl-4/27, A-II	M.C.B		2 Sets		
2	Encl-4/68, A-II	Analog multi Meter		4		
3	Encl-4/69, A-II	Digital Multi meter		8		
4	Encl-4/70, A-II	A.C. Voltmeter, MI		2		
5	Encl-4/71, A-II	Milli Voltmeter centre zero		2		
6	Encl-4/72, A-II	D.C Milli ammeter		2		
7	Encl-4/73, A-II	D.C. Ammeter MC		2		
8	Encl-4/74, A-II	Ammeter MC		2		
9	Encl-4/75, A-II	Ammeter MC		2		
10	Encl-4/76, A-II	A.C. Ammeter MI		2		
11	Encl-4/77, A-II	A.C. Ammeter MI		2		
12	Encl-4/78, A-II	K.W. Meter		2		
13	Encl-4/79, A-II	A.C. Energy Meter		2		
14	Encl-4/80, A-II	Single Phase power factor meter		2		
15	Encl-4/81, A-II	Frequency Meter		2		
16	Encl-4/83, A-II	Current transformer		2		
17	Encl-4/84, A-II	Potential Transformer		2 Sets		
18	Encl-4/86, A-II	Tong tester/ Clamp meter		2		
19	Encl-4/87, A-II	Megger set		2 sets		
20	Encl-4/88, A-II	Wheat stone bridge		2		
21	Encl-4/96, A-II	DC power supply		3		
22	Encl-4/98, A-II	Servo Voltage Stabilizer		2		
23	Encl-4/108, A-II	Flux meter		2		
24	Encl-4/109, A-II	Lux meter		2		
25	Encl-4/128, A-II	Auto transformer		1		
26	Encl-4/138, A-II	Clamp on Ammeter		3		
27	Encl-4/142, A-II	Earth Resistance Tester		2		
28	Encl-4/147, A-II	Stabilized low voltage power supply		1		
29	Encl-4/149, A-II	High Voltage Probe with meter		4		
30	Encl-4/157, A-II	Mini drill machine for P.C.B's		1		
31	Encl-4/163, A-II	Degaussing coil		2		
32	Encl-4/165, A-II	Motor Winding Set	FHP AC motor set	1		
			FHP DC motor set	1		
33	Encl-4/168, A-II	Electronic Flasher		1		
34	Encl-2/108, A-II	Ammeter AC/DC		5		
				5		
35	Encl-2/110, A-II	Megger		1		
36	Encl-2/112, A-II	Wattmeter multi range up		1		

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine						
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Unit FOR Nhavasheva Port Price in Ind. Rs**	**Total FOR Nhavasheva Port Price in Ind. Rs.**
		to 1KW				
37	Encl-2/113, A-II	Wattmeter multi range up to 5KW		1		
38	Encl-2/118, A-II	RLC Bridge		1		
Total FOR Nhavasheva Port Prices in Indian Rupees						
Total Indian Rupees (in words)						

It is hereby certified that we have understood the instruction to Bidders and also the Terms & Conditions of Contract attached to the tender and have thoroughly examined and are aware of the nature of supplies/services required and our offer is to render supplies/services strictly in accordance with the requirements and according to the terms of the tender. We agree to abide solely by the terms & conditions of contract and other conditions of the tender in accordance with the tender documents if the contract is awarded to us.

We hereby offer to render supplies/ services as detailed above or such portion thereof as you may specify in the acceptance of tender at the price quoted and agree to hold this offer open for acceptance for a period of 90 days from the date of opening of tender. We shall be bound by the communication of acceptance dispatched within the prescribed time.

We possess the necessary License from the Government of India/State Government for rendering the supplies / services.

Dated:……..

Signature and seal of Authorized Signatory

NOTE

1. The offer must be submitted as per above proforma. The Bidder may use his letterhead to submit his offer.
2. No erasures or alternations in the text of the offer are permitted.
3. Any correction made in offer shall be initialed by the Bidder.
4. VALUES should be both in figures and Words.
5. **The prices quoted should be most competitive**

Annexure – 2

PROFORMA FOR STATEMENT OF DEVIATIONS FROM TENDER CONDITIONS

The following are the particulars of deviations from the requirements of the Instructions to Bidders and Terms & Conditions of contract (To be enclosed for each lot separately): -

CLAUSE	**DEVIATION**	**REMARKS** (Including justification)

…….
Signature and seal of
the Authorized Signatory

NOTE: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating “No Deviations”.

Annexure – 3

PROFORMA FOR COMMERCIAL DETAILS & PREVIOUS EXPERIENCE

(i) Is the firm registered with Govt. Authority/ Agency or MNC? If so, a copy of the registration certificate should be enclosed.

(ii) Name and address of the Banker

Details of major orders for the quoted supplies/services executed during the past three years should be furnished in the following format.

Sl. #	Full Address of Customer	Order No. and Date	Description of Supplies / Services	Qty.	Contract Value in Rs.	Remarks
1	2	3	4	5	6	7

Signature:……..
Name:……..
Designation:……..

NOTE: A certificate from the customer should preferably be enclosed to indicate that the contract was satisfactorily performed.
To be enclosed for each lot separately.

Annexure – 4

PROFORMA FOR PERFORMANCE BANK GUARANTEE

THE GENERAL MANAGER, PROJECTS
HMT (INTERNATIONAL) LTD.
HMT BHAVAN
59 BELLARY ROAD
BANGALORE – 560 032

DEAR SIR,

THIS DEED OF GUARANTEE EXECUTED BY …… BANK, (NAME AND ADDRESS OF THE BANK) (HEREINAFTER REFERRED TO AS BANK) IN FAVOUR OF HMT (INTERNATIONAL) LTD. (HEREINAFTER REFERRED TO BENEFICIARY) NOT EXCEEDING RS……. (RUPEES …….. ONLY) AT THE REQUEST OF M/S. …… (HEREINAFTER REFERRED TO AS SUPPLIER).

WHEREAS THE SUPPLIER HAS APPROACHED BANK TO ISSUE BANK GUARANTEE IN YOUR FAVOUR FOR A SUM OF RS. ……. (RUPEES …….. ONLY). WHEREAS THE SUPPLIER HAS RECEIVED PURCHASE ORDER NO. …… DATED ……. FOR RS ……. FOR PROVIDING SERVICES AS STATED IN THE PURCHASE ORDER. WHEREAS THE SUPPLIER HAS TO SUBMIT PERFORMANCE GUARANTEE FOR TEN PERCENT OF THE VALUE OF SUPPLIES PORTION OF RS……AS STATED IN THE SAID PURCHASE ORDER.

WE HEREBY CONFIRM AND STATE THAT WE AS GUARANTORS SHALL BE RESPONSIBLE TO YOU ON BEHALF OF THE "SUPPLIER" FOR A TOTAL SUM OF RS…… (RUPEES …… ONLY) IN CASE OF VIOLATION OF ANY OF THE TERMS/CONDITIONS OF THE SAID PURCHASE ORDER.

WE UNDERTAKE TO PAY YOU UPON FIRST WRITTEN DEMAND DECLARING THE "SUPPLIER" TO BE IN VIOLATION/BREACH OR CONTRAVENTION OF ANY OF THE TERMS AND CONDITIONS, WITHOUT DEMUR OR ARGUMENT OR COURT ORDER OR RESOLUTION WITHIN THE VALIDITY OF THIS GUARANTEE, A SUM OF RS…… (RUPEES …… ONLY) AS AFOREMENTIONED WITHOUT YOUR HAVING TO PROVE TO US OR TO SHOW GROUNDS OR REASONS FOR YOUR DEMAND FOR THE SUM SPECIFIED HEREIN.

THE GUARANTEE CONTAINED HEREIN SHALL NOT BE AFFECTED BY ANY CHANGES IN THE CONSTITUTION OF THE BANK OR IN THE CONSTITUTION OF THE BENEFICIARY VIZ. YOURSELF AND SHALL BE VALID TILL (DATE) FROM THE DATE OF ISSUE PROVIDED HOWEVER THAT IN CASE DEMAND IS NOT MADE BY YOU UNDER THIS GUARANTEE ON OR BEFORE (DATE) , BANK SHALL BE FULLY ABSOLVED FROM ANY LIABILITY UNDER THIS GUARANTEE DEED.

WE HEREBY DECLARE AND STATE THAT THIS GUARANTEE UNLESS INVOKED BY YOU AS AFORESAID SHALL BE VALID TILL (DATE) FROM THE DATE OF ISSUE AND SHALL BE NULL AND VOID THEREAFTER WHETHER THE ORIGINAL GUARANTEE IS RETURNED OR NOT

Annexure – 5

PROFORMA FOR VENDOR APPRAISAL

General Information

Vendor Code

1. *Company*

M/s. _____ Phone: _____

_____ _____

_____ Fax: _____

_____ E-Mail: _____

City: _____ _____

PIN: _____ Web Site: _____

2. *Contact Person*

Name: _____ Designation: _____

E-Mail: _____ Phone: _____

3. Number of Years in Business : _____

4. Number of Units : _____

5. Total Number of Employees : _____

6. *Major Customers*

1) _____ 4) _____

2) _____ 5) _____

3) _____ 6) _____

Y ☐ N ☐

7. *Sales Office/Authorized Distributor*

If yes Indicate details below

A M/s. _____ M/s. _____

_____ _____

_____ _____

_____ _____

_____ _____

PIN _____ PIN _____

Phone: _____ Phone: _____

Fax: _____ Fax: _____

E-Mail _____ E-Mail _____

C M/s. _____ M/s. _____

PIN _____ PIN _____

Phone: _____ Phone : _____

Fax : _____ Fax : _____

E.Mail _____ E.Mail _____

Production & Service Capabilities

1 *Product Range*

a _____ f _____

b _____ g _____

c _____ h _____

d _____ I _____

e _____ j _____

2 *Processes Existing in the Plant*

	Processes	Availability	Details
1	Conventional Machining	☐ Y ☐ N	N.A
2	CNC Machining	☐ Y ☐ N	
3	Forging	☐ Y ☐ N	
4	Casting	☐ Y ☐ N	
5	Plating	☐ Y ☐ N	
6	Fabrication	☐ Y ☐ N	
7	Tool Making	☐ Y ☐ N	
8	Welding	☐ Y ☐ N	
9	Gear Manufacturing	☐ Y ☐ N	
10	Designing	☐ Y ☐ N	

Quality Information

1 *Control adopted*

			Details
a	In-Process Inspection	☐ Y ☐ N	
b	Stage Inspection	☐ Y ☐ N	

c	Testing	☐ Y ☐ N	
d	SQC/SPC	☐ Y ☐ N	

2 *Inspection & Testing Facility Available*

			Details
a	Material Testing	☐ Y ☐ N	
b	Precision Measurement	☐ Y ☐ N	
c	Furnace Testing	☐ Y ☐ N	
d	Non-Destructive Testing	☐ Y ☐ N	
e	Calibration	☐ Y ☐ N	

3 Quality System Implemented-ISO 9000/QS 9000 ☐ Y ☐ N Enclose Certificate

4 Capability to supply products with CE Marking ☐ Y ☐ N

5 Quality Level of Existing Products

1	2	3	4	5
☐	☐	☐	☐	☐
Poor	Fair	Good	Very Good	Excellent

⇨

Commercial & Financial Information

		2011-12	2012-13	2013-14
1	Annual Turnover for last 3 Years in Rs.Lakhs			
	Net Profit for the last 3 years Rs. Lakhs			
2	Exports ☐ Y ☐ N			
	If Yes, Turnover for last 3 Years in Rs.Lakhs			

3 Specify Countries to which Exports are made

USA	☐
UK	☐
Europe	☐
Middle East	☐
CIS Countries	☐
Others	☐

4 Any Collaboration ☐ Y ☐ N

If Yes, Indicate Details

5	Any investment Envisaged for Expansion		☐ Y ☐ N
6	Is company following Direct Procurement Principle		☐ Y ☐ N
7	KST / CST Registration No.		
8	Central Excise	No	
		Range	
9	SSI Registration No.		
10	Do you have Company Brochure		☐ Y ☐ N
11	Experience in handling Government of India's projects		☐ Y ☐ N
	If yes, value of projects executed so far Rs. Lakhs		
12	Is the company registered with MEA ?		☐ Y ☐ N
	If Yes, Value of Supply done to MEA Projects	Direct supply	Thru Agency
		Rs. Lakhs	
13	Supplies done to HMT(I)		☐ Y ☐ N
	If Yes, Value of Supplies done Rs. Lakhs		
	Details of supplies to HMT(I):		

Compiled by:

Signature: _____

Name: _____

Date _____

Note:

1 Put √ in appropriate check box.

2 If space provided is not sufficient to provide details, please attach extra sheet.

3 Please attach catalogue/Brochure if available.

Annexure - 6

PROFORMA FOR VENDOR REGISTRATION

	S.N.	Description	Details
		(a) Name and address of the vendor	
		(b) Please specify whether you are : Manufacturing Unit / Distributor / Agent etc.,	
	1	(c) Telephone No.	
		(d) Fax No.	
		(e) Email ID	
		(f) Company Profile (Please enclose)	
		(g) Turnover of the Company for the past three years	
		(h) Bankers Details	
	2	Quality system implemented - ISO 9000 / QS 2000 etc.	
	3	Name, address & Telephone No. of the owner / proprietor/partners	
	4	Sales Tax Registration No. - Central & State	
	6	Registration No.	
	7	Details of Products Manufactured / Distributed / offered. Please enclose brochure.	
	8	Details of Manufacturing Units / Workshops etc., available	
	9	Details of Machines, equipment, computers available	
	10	Manpower / Organization structure	
	11	List of Major Products / Services	
	12	Details of your major customers	
	13	Are you exporting Products / services? If so, please furnish	
		details of exports for past 3 years.	
	14	Are you providing training to overseas students/trainers and if so,	
		give details of the training courses conducted for last 3 years	
	15	Do you have branches or institutes under your group, If yes,	
		give details with address.	
	16	Whether you are affiliated / accredited to any Govt.	
		Agency / Reputed organization	
	Declaration: I / We declare that the details given above are true and correct.		
	Place : Signature of Authorized person		
	Date :		With Company Seal

(Note: Please attach detailed information in a separate sheet wherever required)

ANNEXURE – 7

PROFORMA FOR BANK GUARANTEE FOR BID GUARATNTEE

To,

The General Manager (Projects)
HMT (International) Limited
HMT Bhavan, No.59, Bellary Road
BANGALORE – 560 032

Dear Sir,

In accordance with your invitation to tender No……..M/s. …… hereinafter called the bidder with the following Directors on their Board of Directors/Partners of the firm:

1.
2.
3.
4.
5.

wish to participate in the said tender for supplying Machine / equipment required for project 'Supply of Technical and Vocational Education Training (TVET) equipment and providing Technical Assistance to Vocational Training Centres in Yatta & Hebron, Palestine' being implemented by HMT (International) Limited, Bangalore.

As a Bank Guarantee against Bid Guarantee for a sum of Rs……(in words & figures) valid for 90 days from the date of opening of the Tender No…… is required to be submitted by the bidder as a condition for the participation, this bank hereby guarantees and undertakes during the above said period of 90 (Ninety) days to immediately pay, on demand by HMT (International) Limited, Bangalore in writing the amount of Rs…… (words & figures) to HMT (International) Limited, Bangalore without any reservation and recourse, if:

1) The bidder after submitting his tender, modifies the rates or any of the terms and conditions thereof, except with the previous written consent of the purchaser or
2) The bidder withdraws the said bid within 90 days after opening of bid or
3) The bidder having not withdrawn the bid, fails to furnish the contract of Performance Guarantee within the period provided in the terms and conditions of the contract.

This guarantee shall be irrevocable and shall remain valid up to 4.00 p.m. on……..if further extension to this guarantee is required, the same shall be extended to such required periods on receiving instructions from M/s……on whose behalf this guarantee is issued.

Date……. Signature……..

Place……. Printed Name……..

Witness

1…….. ……..
(Designation)

2…….. (Bank's Common Seal)

(Note : This should be on bidders letter head)

ANNEXURE – 8

QUALITY AND PACKING DETAILS

1. MACHINE / EQUIPMENT:

1.1 Machine / Equipment shall be manufactured and delivered in accordance with the specifications as given in this Tender and quality shall be as per Indian / International Standards.

1.2 Goods supplied shall be new, genuine, unused and shall be of current models and of current productions.

1.3 Any alteration to the specifications, Design, Patterns etc. of the offered goods shall only be made upon the Buyer's consent in writing.

1.4 The Tenderer warrants that the materials, metals, chemicals, paints, packing pieces etc. used in the manufacture of goods and all its packing and packaging are fully trivialized and stable under tropical conditions. Any damages arising from the inadequate trivialization, shall be deemed an inherent defects of manufacture.

1.5 **BOUGHT-OUTS**:
All the bought-out items such as bearings, belts, electricals, motors, contactors, switches, MCBs, fuses, transformers, rubber gaskets, O-rings, conduit pipes, coolant and hydraulic hoses etc. **shall correspond to ISI / International specifications, should preferably have CE mark** and shall be of reputed make like SKF, FENNER, BHARAT, BIJILEE, CUTTLER HAMMER, CROMPTON GREAVES, SIEMENS and TELEMECHNIC.

1.6 Bought-out accessories like Furnace Lamps, pumps, Panel Air conditioners, Oil Coolers, Panel Boards, Stabilizers, Transformers etc. should be from reputed original equipment manufacturers.

1.7 Machine / Equipment aesthetics especially sheet metals, guards, doors, covering plates, castings are to be made to international standards. Painting and finish of Furnaces are the most important aspects of aesthetics.

2. INSTRUCTION & SPARE PARTS MANUALS:

2.1 Neatly printed manuals should be sent with the Machine / Equipment. Instruction Manuals should be of updated version containing complete details of offered Machine / Equipment including customer name, Machine / Equipment number, Machine / Equipment model, year of manufacture etc..

2.2 Drawings should be clear and legible. Xerox copies are not acceptable. Details of bought-out items used in the Machine/Equipment should be included in the manual. Good quality paper should be used for printing of manuals.

2.3 All foundation drawings showing electrical, air, water and other service connections of Machine / equipment, with floor plans to be provided in two sets, in English.

3. SAFETY DEVICES:

Each Machines/equipment should be provided with adequate and all necessary safety devices for the protection of the operator/s, factory personnel and the environment.

4. OTHER CONDITIONS:

Since Machine / Equipment are being exported, Machine / Equipment including all accessories have to be built to ensure high quality performance, aesthetic appearance in respect of general finish, painting, sheet metal fabrication and international safety regulations.

5. PACKING INSTRUCTIONS:

5.1 Export worthy wooden / plywood packing as per Indian / International standards suitable for sea freight.

5.2 Equipment, accessories and spares are to be covered by thick silpaulin sheet or 1 mm thick polythene sheets and all openings are to be sealed .

5.3 All external bright / machined surfaces should be protected with coating of OKS-CORTEC VCI 369 N Rust preventive. OKS rust preventive to be used.

5.4 Rust preventives to be used whose shelf life is not less than one year.

5.5 Packing list with respect to each case to be prepared and given to HMT(I) along with other documents.

5.6 Machine / Equipment should be firmly fixed to be base of packing case to prevent jerking or local movement.

5.7 Delivery Voucher should clearly indicate packing case dimension with net and Gross weight and case number if there are more than one case.

5.8 Photographs before and after packing to be taken and sent to HMT(I).

5.9 Handling marks of the packing cases to be shown on packing cases.

Enclosure - I

Lot-1 - Autotronics Trainer Equipment

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 1 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully operational Multi Point Injection Petrol Engine, Complete with Fuel, Ignition, Cooling, Exhaust Systems, Starting and Charging System.		1 No.
1	**Major specifications**		
	The Four stroke petrol engine setup of Japanese Technology will be prepared by using new multi cylinder car engine of above 1100 cc with all the fittings of the engine along with radiator, silencer, air filter, starter, battery, alternator, indication meters, fuel tank, electrical wiring with ignition switch etc., all mounted on to a sturdy iron frame with caster wheels (mobile trolley). All the fittings such as meter, fuel tank, radiator etc., along with the engine will be arrange on to the paint finished trolley with its original fittings such as rubber dampers and clamps so as to contain the vibrations. The wiring for the sensors, indication meters etc, will be done so that by cranking the ignition the engine will start working, the indications such as alternator charging, oil pressure, temperature etc., will be displayed on to the necessary indication meter attached. The engine assembly will be serviced, painted with a single colour paint. MPFI engines will be fitted with all necessary sensors, injectors and other MPFI accessories, ECU etc., which will be duly connected by its original wiring harness and will be made to work along with necessary indications. 1. Colored circuit diagram of the engine management system is printed on to a 6mm organic glass base for training. 2. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, and frequency and wave form signals are provided on to the printed circuit diagram. 3. Automobile meters are fitted on to the training module along with the printed circuit diagram, to demonstrate engine speed, temperature, fuel pressure, charging light etc., 4. The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream. 5. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 2 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully Operational Single Point Injection Petrol Engine, Complete with Fuel, Ignition, Cooling and Exhaust Systems.		1 No.
1	**Major specifications**		
	The Four stroke petrol engine setup of above 1400 cc will be prepared by using good working condition multi cylinder car engine with all the fittings of the engine along with radiator, silencer, air filter, starter, battery, alternator, indication meters, fuel tank, electrical wiring with ignition switch etc., all mounted on to a sturdy iron frame with caster wheels (mobile trolley). All the fittings such as meter, fuel tank, radiator etc., along with the engine will be arrange on to the paint finished trolley with its original fittings such as rubber dampers and clamps so as to contain the vibrations. The wiring for the sensors, indication meters etc, will be done so that by cranking the ignition the engine will start working, the indications such as alternator charging, oil pressure, temperature etc., will be displayed on to the necessary indication meter attached. The engine assembly will be serviced, painted with a single colour paint. Engine will be fitted with all necessary sensors, injectors and other accessories, ECU etc., which will be duly connected by its original wiring harness and will be made to work along with necessary indications.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 3 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully operational Diesel Engine, Complete with fuel, Cooling, Turbo and Exhaust Systems, Starting and Charging System – (Volkswagen 1.9 Turbo Diesel Engine Complete with BOSCH Electronic Diesel Control System, fitted with manufactures Diagnostic socket 16 Pin).		1 No.
1	**Major specifications**		
	The Four stroke Diesel engine setup will be prepared by using good working condition multi cylinder diesel engine with all the fittings of the engine along with air filter, starter, battery, alternator, indication meters, fuel tank ,electrical wiring etc., all mounted on to a sturdy iron frame with caster wheels (mobile trolley) . All the fittings such as meter, fuel tank, radiator etc., along with the engine will be arrange on to the paint finished trolley with its original fittings such as rubber dampers and clamps so as to contain the vibrations. The wiring for the sensors, indication meters etc, will be done and painted with a single colour paint. CRDI engines will be fitted with all necessary sensors, injectors and other CRDI accessories, ECU etc., which will be duly connected by its original wiring harness and will be made to work along with necessary indications. 1. Colored circuit diagram of the engine management system is printed on to a 6mm organic glass base for training. 2. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, and frequency and wave form signals are provided on to the printed circuit diagram. 3. Automobile meters are fitted on to the training module along with the printed circuit diagram, to demonstrate engine speed, temperature, fuel pressure, charging light etc., 4. The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream. 5. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 4 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully operational Diesel Engine, complete with Fuel, Cooling, Turbo and Exhaust System, Starting and Charging system – (Common Rail Turbo Diesel Engine, Complete Bosch or Siemens Electronic Diesel Control System fitted with manufactures Diagnostic socket 16 Pin).		1 No.
1	**Major specifications**		
	The Four stroke Diesel engine setup of above 1300 cc will be prepared by using good working condition multi cylinder diesel engine with all the fittings of the engine along with air filter, starter, battery, alternator, indication meters, fuel tank ,electrical wiring etc., all mounted on to a sturdy iron frame with caster wheels (mobile trolley) . All the fittings such as meter, fuel tank, radiator etc., along with the engine will be arrange on to the paint finished trolley with its original fittings such as rubber dampers and clamps so as to contain the vibrations. The wiring for the sensors, indication meters etc, will be done and painted with a single colour paint. CRDI engines will be fitted with all necessary sensors, injectors and other CRDI accessories, ECU etc., which will be duly connected by its original wiring harness and will be made to work along with necessary indications. 1. Colored circuit diagram of the engine management system is printed on to a 6mm organic glass base for training. 2. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, and frequency and wave form signals are provided on to the printed circuit diagram. 3. Automobile meters are fitted on to the training module along with the printed circuit diagram, to demonstrate engine speed, temperature, fuel pressure, charging light etc., 4. The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream. 5. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 6 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Sets of all sensors and actuators used for modern Engines suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		2 Nos.
1	**Major specifications**		
	The Instruction board adopts the real components of electronic fuel injection system to illustrate engine fuel system structure and working principle. The components are rigged onto colour circuit diagram. And made functional. Features 1. Real and operatable engine fuel injection system is assembled onto a colour printed board to illustrating the structure and working process. 2. Colored circuit diagram on the training Module printed on to 6mm organic glass base. Where in the students can compare the diagram and actual diagram. 3. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals are provided on to the printed circuit diagram. 4. The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream. 5. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults. 6. Set the line break, grounding short circuit, improper contact or open circuit faults can be induced, user can adjust the number and type of faults. 7. Good working condition Parts will be provided with fuel tank. The instruction board has to be connected to 220V AC socket which changes to 12V DC internally so that the board works without battery. 8. The training module is fabricated using steel pipe frame with spray painted for good looks and the entire setup is provided with caster wheels with brakes for easy movement of the same.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 7 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Simulation of Central Door Locking with Alarm system and power windows including real working on car door suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	The Instruction board adopts the real components of Central door Locking and alarm system to illustrate Locking and safety system structure and working principle. The components are rigged onto colour circuit diagram. And made functional. Features 1. Real and operatable Central door Locking and alarm system is assembled onto a colour printed board to illustrating the structure and working process .A real driver side sectioned door will be assembled on to the system to show the operation and demonstrate the internal construction details showing the minute information such as motor and its gear arrangement etc., and working of the power window system. 2. Colored circuit diagram on the training Module printed on to 6mm organic glass base. Where in the students can compare the diagram and actual diagram. 3. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals are provided on to the printed circuit diagram. 4. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults. 5. Set the line break, grounding short circuit, improper contact or open circuit faults can be induced, user can adjust the number and type of faults. 6. Good working condition Parts will be provided with fuel tank. The instruction board has to be connected to 220V AC socket which changes to 12V DC internally, so that the board works without battery. 7. The training module is fabricated using steel pipe frame with spray painted for good looks and the entire setup is provided with caster wheels with brakes for easy movement of the same.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 8 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Complete Set of Alarm System suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	The complete set of Central door Locking / alarm system will be suitably arranged on to a board for complete idea of the Alarm system of a four wheeler. In this board the actual wiring with parts, naming and we will be arranged according to the Vehicle. Where in the identification of the components and its variable parts can be done.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 9 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Complete set of ABS Components suitable for 3 phase, 380 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	The device is designed on the ABS system, where in the principle of operation and working of the same can be demonstrated. A parts and accessories are arranged on to a Colour printed board. And the system is made functional. Features 1. Real and operatable ABS brake system is assembled onto a colour printed board to illustrating the structure and working process. 2. The front and rear Disc Brake with calipers are coupled to two different three phase motor with electric drives to rotate the front disc and rear disc separately. A brake Pedal along with vacuum booster is connected to the Front caliper system and rear drum brake system, a vacuum pump will be connected to the booster to demonstrate the effect of vacuum in the pedal operation. 3. The Device is connected with Pressure meters to demonstrate the different pressure at different locations in the brake system. 4. Colored circuit diagram on the training Module printed on to 6mm organic glass base. Where in the students can compare the diagram and actual diagram. 5. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals are provided on to the printed circuit diagram. 6. The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream. 7. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults. 8. Set the line break, grounding short circuit, improper contact or open circuit faults can be induced, user can adjust the number and type of faults. 9. Good working condition Parts will be provided with fuel tank. The instruction board has to be connected to 220V AC socket which changes to 12V DC internally, so that the board works without battery. 10. The training module is fabricated using steel pipe frame with spray painted for good looks and the entire setup is provided with caster wheels with brakes for easy movement of the same.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Display of equipment specification to be provided.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 10 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Complete set of Airbag Components with suitable air compressor suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	The Instruction board adopts the real components of Air bag system to illustrate Air bag safety system structure and working principle. The components are rigged onto colour circuit diagram and made functional. Features: 1. Real and operatable Air bag system is assembled onto a colour printed board to illustrating the structure and working process. 2. The Vehicle Crash is simulated by pushing and hitting the crash sensor along the rail provided to demonstrate the quick air bag inflation. 3. Colored circuit diagram on the training Module printed on to 6mm organic glass base. Where in the students can compare the diagram and actual diagram. 4. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals are provided on to the printed circuit diagram. 5. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults. 6. Set the line break, grounding short circuit, improper contact or open circuit faults can be induced, user can adjust the number and type of faults. 7. Good working condition Parts will be provided with fuel tank. The instruction board has to be connected to 220V AC socket which changes to 12V DC internally, so that the board works without battery. 8. The training module is fabricated using steel pipe frame with spray painted for good looks and the entire setup is provided with caster wheels with brakes for easy movement of the same.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 11 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Air Compressor suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	Trolley type portable reciprocating type air compressor single cylinder with 45 liters capacity Air tank, along with accessories & with working pressure 6.5 kg/sq cm.		
2	Operating manuals containing troubleshooting		3 sets
3	Colour	Standard Colour	
4	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
5	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 12 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Hand held Diagnostic Tester		1 No.
1	**Major specifications**		
	1. Complete Worldwide Coverage 2. Up gradation through Internet 3. Big Capacity 128MB with software for Japanese, Korean, Indian Vehicles 4. DTC, Live Reading, Actuation tests and Key coding 5. Connector locations, Wiring Diagrams and help menus 6. Real-time PC interface through USB port		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 13 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Wireless Diagnostic tester include Laptop suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	Hardware details 1. PC based scan module 2. LED Indicator 3. 32 bit RISC Micro Controller Operation 4. – 32 VDC Input range 5. Designed for low power consumption (Max 150mA) 6. Bluetooth 2.1 +EDR Wireless communication **Features** 1. Remote Control 2. Feedback system 3. Self testing 4. Monitoring 5. All Protocol Included 6. Key coding available 7. OEM Level Software 8. Intuitive Simple User Interface 9. Wireless Communication		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 14 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully operational ESP Trainer. Complete with braking circuit and manufactured using original vehicle components. Simulation of wheel lock to active the ABS. pressure gauges indicate individual front and rear line pressures at each wheel. Brake pedal kick back can be observed. Diagnostic socket fitted for the connection of fault code readers suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	The ESP Trainer Module is designed on the ESP based ABS system, where in the principle of operation and working of the same can be demonstrated. A parts and accessories are arranged on to a Colour printed board. And the system is made functional. Features 1. Real and operatable ABS brake system is assembled onto a colour printed board to illustrating the structure and working process. 2. The front and rear Disc Brake with calipers are coupled to two different three phase motor with electric drives to rotate the front disc and rear disc separately. A brake Pedal along with vacuum booster is connected to the Front caliper system and rear drum brake system, a vacuum pump will be connected to the booster to demonstrate the effect of vacuum in the pedal operation. 3. The Device is connected with Pressure meters to demonstrate the different pressure at different locations in the brake system. 4. Coloured circuit diagram on the training Module printed on to 6mm organic glass base. Where in the students can compare the diagram and actual diagram. 5. Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals are provided on to the printed circuit diagram. 6. The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream. 7. Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults. 8. Set the line break, grounding short circuit, improper contact or open circuit faults can be induced, user can adjust the number and type of faults. 9. Good working condition Parts will be provided with fuel tank. The instruction board has to be connected to 220V AC socket which changes to 12V DC internally, so that the board works without battery. 10. The training module is fabricated using steel pipe frame with spray painted for good looks and the entire setup is provided with caster wheels with brakes for easy movement of the same.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 15 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully operated automotive automatic Air Condition System Simulator suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	This model is made out of original New parts, will be suitably arranged on to a metal frame with navopan/laminated board to demonstrate details of Piping connection, Wiring circuit with all the accessories such as Cooling Coil, compressor, evaporator, necessary hoses, condenser etc., the model will be made to work using a FHP motor so that by operating the AC panel the operation and cooling effect of the same can be demonstrated, the Model will contain a car Battery for the operation of the blower and Magnetic clutch the entire system will be suitably painted.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine				
Ref No. Enclosure – 16 / 2 of Annex VII				
Sl. No	Item	Brief Specification		Qty.
	Automotive special Multi Meter			1 No.
1	**Major specifications**			
	CV	Maximum voltage	1000V	
		Accuracy	±(0.1%+1)	
		Best resolution	0.01 mV	
	ACV	Maximum voltage	1000V	
		Accuracy	±(0.5%+2)	
		AC bandwidth	5kHz	
		Best resolution	0.01 mV	
	DC current	Maximum amps	10A	
		Amps accuracy	±(0.4%+2)	
		Best resolution	0.001 mA	
	AC current	Maximum amps	10A	
		Amps accuracy	±(1.2%+2)	
		Best resolution	0.001 mA	
	Resistance	Maximum resistance	50 MΩ	
		Accuracy	±(0.4%+1)	
		Best resolution	0.1Ω	
	Capacitance	Maximum capacitance	9,999 µF	
		Accuracy	±(1%+2)	
		Best resolution	0.01 nF	
	Frequency	Maximum frequency	200 KHz	
		Accuracy	±(0.005%+1)	
		Best resolution	0.01 Hz	
	Duty cycle	Maximum duty cycle	99.9 %	
		Accuracy	within 2% per KHz +0.1%	
		Best resolution	0.1 %	
	Temperature measurement	-200.0°C - 1090°C	1.0% excluding probe	
		-328.0°F - 1994.0°F,		
	80 BK temperature probe	-40 °C - 260 °C	or 2% whichever is greater	
		-40 °C - 260 °C		
	Conductance	Maximum conductance	60.00 nS	
		Accuracy	±(1.0%+10)	
		Maximum resolution	0.01 nS	
	Operating range	Operating temperature	-20 °C - 55 °C	
		Storage temperature	-40 °C - 60 °C	
	Physical	5.2 cm x 9.8cm x 20.1 cm (2.06" x 3.86" x 7.93") 624 g (22 oz.)		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.			

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 16 / 2 of Annex VII			
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Sl.	Item	Brief Specification	Qty.
Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 17 / 2 of Annex VII			
	3D wheel Alignment unit suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		

Technical Features	**Accuracy**	**Measuring Range**	**Total Measuring Range**
Front Axle			
Total Toe	+/- 2’	+/- 2 Deg	+/- 20 Deg
Partial Toe	+/- 1’	+/- 1 Deg	+/- 10 deg
Set-back	+/- 2’	+/- 2 Deg	+/- 5 Deg
Camber	+/- 5 ‘	+/- 3 Deg	+/- 10 Deg
Caster	+/- 7’	+/- 10 Deg	+/- 18 Deg
King Pin	+/- 7’	+/- 10 Deg	+/- 18 Deg
Rear Axle			
Total Toe	+/- 2’	+/-2 Deg	+/- 20 Deg
Partial Toe	+/- 1’	+/- 1 Deg	+/- 10 Deg
Camber	+/- 5’	+/- 3 Deg	+/- 10 Deg
Thrust Angle	+/- 2’	+/- 2 Deg	+/- 5 Deg
Set - Back	+/- 2’	+/- 2 Deg	+/- 5 Deg

Features

1. Battery operated for fixed or mobile installation
2. Exclusive real 3D Targets
3. Bluetooth transmission between the front measuring heads and control unit
4. Software operating under windows with 90,000 vehicle data and up gradation through Online
5. Data bank of vehicle stored with vehicle registration number & search either through name or number
6. Quick run-out
7. Summary and comparison of diagnosis / repair values on a single screen
8. Less bay area usage: Without pillar or T bar, without need of frontal vacant area between the sensor and target.
9. Easily Portable between bays
10. Easy databank up gradation and customer data backup

2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 18 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	4 Gas Analyzer with suitable PC - suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	1. Measures CO,HC,CO_2,O_2 2. Engine RPM for Sealed engines 3. Oil Temperature measurement 4. Air Fuel Ratio and Lambda Measurements 5. Option to add Nox measurement facility 6. OMIL Class1 category 7. RS 232 Port 8. Mounted on a suitable table		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 19 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Common Rail Injector Tester suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	• For testing Piezo-Electric Injectors (SIEMENS) • It can test 1 injectors at a time • Simulates 1 injectors at a time • Measure delivery quantity at different pulse width • Simulates with your old test bench • Supported common rail injectors Piezo-Electric Injectors • Digital pressure regulator for adjusting the rail pressure • Mounted on a suitable table		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine

Ref No. Enclosure – 20 / 2 of Annex VII

Sl. No.	Item	Brief Specification	Qty.
	Lift for wheel Alignment suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		

Low Profile Electro Hydraulic Scissor lift

All pivot points made with self lubricating bushings for long life.

CE approved lift with low voltage controls.

No cross rails or torsion bars between lifting platforms (for max. accessibility in the working area).
Every time the platforms reach the floor, the lift must be perfectly levelled using the special valve
Mechanical locking device with automatic engagement and pneumatic release, ensuring maximum safety when lift is in standing position.
Hydraulic levelling system by means of a synchronization device assures constantly level lifting
Platforms regardless of weight distribution

Minimal platforms height 155 mm: easy access including cars with low spoilers

Lifts for wheel alignment with front recesses for turntables and rear slip plates

Built in wheel free lift with adjustable extensions to optimize vehicle loading

TECHNICAL SPECIFICATION

S.No	Specification	Values
1	Capacity of main lift (kg)	3500 Kg
2	Lift table capacity (kg)	3500 Kg
3	Motor (kW)	2.6 kW
4	Main lift elevation time (")(with maximum charge)	34
5	Lift table elevation time (")(with maximum charge)	5
6	Main lift drop time (")(with maximum charge)	31
7	Lift table drop time (")(with maximum charge	10
8	Noise level dB(A)	70
9	Air pressure (bar)	Min 6 – Max 10 Bar
10	Hydraulic control box max oil pressure (bar)	270 bar

2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 21 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully operated steering system with all components suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	The Working setup of Hydraulic power steering of German Technology is made out of original hydraulic steering system completely rigged on to a metal frame, where in a complete hydraulic circuitry will be connected with the hydraulic pump motorized to pressurize the hydraulic oil inside the system. The steering system will be with complete suspension system, tyres and wheels. A rotary platform will be provided under the tyres to demonstrate the vehicle load. So that the Steering with and without the hydraulic power can be demonstrated.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 22 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Fully Automatic 'AIRCO' service center with integrated-Nitrogen Pressure testing suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	1. Power Supply 1PH,220V,50Hz 2. Power 60W 3. Nitrogen Purity 95%-95.5% 4. Input Air Pressure 100-145psi,8-10Kg/cm^2 5. Breaking Pressure >145psi(>10Kg/cm2) 6. Output Nitrogen Pressure 58-100psi,4-7Kg/cm^2 7. Nitrogen Producing Speed 2000-4000L/h 8. Measuring Range 0.4-9.99Kg/cm2,5-145psi 9. Working Temp. -20 deg C to 70 deg C		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 23 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Sensors Simulator		1 No.
1	**Major specifications**		
	This experiment box is designed based on the original auto sensors and actuators, fully display the structure and working process of auto sensor and actuators. The experiment box is equipped with detection terminal for the sensor and actuators, the student can test the signal through the terminal. Digital voltmeter was installed on the panel of experiment box to display sensor working volt. The circuit is engraved in the white PCV board of experimental box. The experiment box uses ordinary AC 220V power, which will transformed into 12V direct current by the inner rectifier. It requires no battery. The 12V direct current supply has anti-short-circuit function. To be placed on a suitable table.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 24 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	EPROM Reader suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	Mounted on a suitable Table Requirement: USB 2.0 Port Read & Write EN25T80 Automatically recognize the chip Supports PC software & programmer upgrade		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 25 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Immobilizer Key Programmer		1 No.
1	**Major specifications**		
	New Auto transponder chip key copy machine with 3.6-inch TFT LCD display, touch screen operation Features: Function 1: 1) Read out the chip code for 11 12 13 33 T5 40 41 42 44 45 46 48 4C 4D 8C and 8E chips. With the detail format for ID 48 and 4D Chips. 2) New identify functions for Toyota "G "chip key (year: 2010) (Chip: 4D-72). And it will show if the key is the main key or the vice key for Toyota, and later will add new identify function for the Chinese Car. Function 2: It can identify Toyota smart key, and read out the data. Function 3: It supports on copying the chips (11 12 13 33 T5 41 and 42) and parts of 44 and 45. Using "FREE "dedicated chips can copy none battery 4C and 4D chips directly. (Remark :cn1(4C),cn2(4D) is the name of special chip) Function 4: Connecting with PC software, it can save the read key code data unlimited. Function 5: Support on the chip programming: with the inner function of HITAGETI, it can write ID 46 Renault Crypto chips. Function 6: Without removing the ECU (Benz W140), it can start the chip. Function 7: It can unlock the 48 chips except the crypto lock 48 chips. Function 8: Support on the pin code calculating for Hyundai and Kia (before 07 year), by using the Last 6 Codes of VIN Number. Function 9: Support on starting the key and calculating the pin code for more than 60 kinds of cars. Support on programming all kind of Fiat key, such as (11, 13 and 33), These 3 kinds of 48 chips anti-theft way. Function 10: It Upgrade to identify HONDA_46 CRV_46/CIVIC_46/ Mitsubishi 46 Ordinary 60 can be programmed to be 66/67/68/71/74 Function 11: It Upgrade to copy CN1 (4C), CN2 (4D) chip .And size is 6mmX12mmX4mm Support on the software update, such as adding new function for copying the induction card for Electronic Gate. Support Vehicle Model list(directly copy): 1. 11,12,13,33 (Select T5 chip to copy) common models: Zhonghua Junjie, Jinbei, Changhe, Honda (America). etc 2. ID42 (Select ID42 chip to copy) common models*: Jetta 2006 or earlier* 3. 4C chip (select the YS-01/YS02/CN1/CN2 chip to copy) common models: Besturn B50- Besturn B70(Besturn B70 series up to 2012) KIA Carnival - Nissan 4D60 chip series Mitsubishi 4D61 chip series Subaru 4D62 chip series Ford 4D63 chip series Suzuki-4D65 chip series Toyota 4D67-4D68 series Yamaha Motorcycle 4D69 series Kawasaki - Ducati motorcycle series Toyota smart Card(4D71 Series before 2009)		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
	Display of equipment specification to be provided.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 25 / 2 of Annex VII			
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 26 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Electrical Test Bench		1 No.
1	**Major specifications**		
	2 HP Capacity, 3 phase 380 V, 50Hz,1440 rpm Motor Meters: Digital Voltage, Amps Alternator Loading Upto 50amps/12V - 30amps/24V Starter Light Run Upto 100amps/12V-100Amps/24V Small Pulley For Alternator Checking 110v Series Lamp Test Facility Heavy Duty Rugged Mounting Block Heavy Duty Output Cables Three Phase Main Switch All Tripping MCBs Available PCB/Battery Excitation Available		
2	Operating manuals		3 sets
3	Colour	Standard Colour	
4	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
5	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 27 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Spark plug Cleaner & Tester with suitable air compressor suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	Spark Plug Cleaner working on the Pneumatic air supply with the requirement of Air Pressure 8 - 10 kg/cm2. With abrasives and blast cleaning The performance of the spark shall be viewed in the inspection hole. Suitable for M10, M14 and M18 Plugs and supplied with ½ Kg of abrasive sand material. Mounted on a suitable table.		
	Display of equipment specification to be provided.		
2	Operating manuals and troubleshooting		3 sets
3	Colour	Standard Colour	
4	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
5	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 28 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Garage Jack - Hydraulic – trolley type		1 No.
1	**Major specifications**		
	Hydraulic floor crane complete unit, steel tubular structure with heavy duty hydraulic cylinder to lift weight, telescopic arm fitted with chain and hook system, powder coated paint finish. The unit shall be mounted on nylon wheels and swivel arrangement at the back for better manoeuvrability and as per the following technical specifications and along with accessories. A.TECHNICAL SPECIFICATIONS: Lifting Capacity : 2500 Kgs Lifting height : 2400 mm Length of Base : 1555 mm Breadth between Telescopic Length : 950 mm		
2	Operating manuals		3 sets
3	Colour	Standard Colour	
4	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
5	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 31 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Mechanical / Hydraulic Jack– Platform type 3T suitable for Single phase, 220 V, 50Hz AC supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	1. Lifting capacity: 3000Kg 2. Max Lifting Height: 1000mm 3. Min Height: 120mm 4. Space Between Platforms: 700mm 5. Total Width: 1760mm 6. Platform Length: 1400mm 7. Single Platform Width: 530mm 8. Lifting Time: 30s 9. Lowering time:25s 10. Power Supply Voltage: 380V, 3ph 11. Motor power: 2.2Kw 12. Noise: <70dB		
2	Operating manuals		3 sets
	Display of equipment specification to be provided.		
	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting in hard and soft copy in CD		3 sets
3	Colour	Standard Colour	
4	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
5	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Palestine Polytechnic University(PPU), Hebron, Palestine			
Ref No. Enclosure – 32 / 2 of Annex VII			
Sl. No.	Item	Brief Specification	Qty.
	Steel Creeper - 1030 x 415 x 160 mm		10 Nos.
1	**Major specifications**		
	Steel creeper 1030 x 415 x 160mm with head rest, steel casted wheels		
2	Colour	Standard Colour	

Enclosure - II

Lot – 2 Machine Tools:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta and Palestine Polytechnic University (PPU), Palestine			
Ref No. Enclosure – Encl. 100/2 of Annex II, Encl. 6/3 of Annex II, Encl. 28/4 of Annex II, Encl. 30/2 of Annex VII			
Sl. No.	Item	Brief Specification	Quantity
1	**Pillar Type Drilling Machine** with all standard accessories and Electrical suitable **for 380V, 3Phase, 50Hz, AC** supply and control Voltage 220V, 1 phase AC supply. (MCB's to be used in place of fuses)		7
1	Major specifications		
1.1	Drilling capacity in steel / MT in spindle	25 mm / MT3	
1.2	Tapping Capacity	M16	
1.3	No./Range of spindle speeds	10/ 100-2700 rpm	
1.4	No. / Range of power feeds	3 / 0.1, 0.2 & 0.3	
1.5	Spindle traverse	140 mm	
1.6	Pillar diameter	120 mm	
1.7	Max. distance b/w center of spindle and pillar front	260 mm	
1.8	Max. distance b/w spindle and table	610 mm	
1.9	Max. distance b/w spindle and base	1080 mm	
1.10	Table working surface diameter	335 mm	
1.11	Base working surface dimension	320 x 300 mm (DxW)	
1.12	Motor Power	1.5 kW	
1.13	Coolant Motor Power	0.1 kw	
1.14	Colour of the Machine:	Dual colour: Soft Grey (RAL-7035) and Himmel Blue (RAL-5015) Polyurethane Paint	
2	Required Accessories / Spares		
2.1	Coolant pump motor and pipe fittings		1 set each
2.2	Halogen machine lamp		1 set each
2.3	Drill chuck 19 mm with key and arbor		1 set each
2.4	Machine vice 6" swivel base with 'T' bolts		1 no. each
2.5	Reduction sleeve MT3-MT2		1 set each
2.6	Reduction sleeve MT3-MT1		1 set each
2.7	Service Tool Kit		1 set each
2.8	DOL starter		1 set each
3	Set of mechanical and electrical spare parts for 5 year normal operation. (Item wise quantity with price to be provided)		1 set each
4	Operation, Maintenance and spare parts manual		3 sets each
5	Items required for erection and commissioning	• Touch up paint - 1/2 litre each colour in airtight sealed containers, Paint brush ½" 1 no. for each colour • Initial fill of Hydraulic/Lubrication/Cutting Oil, if any in separate sealed containers. • Cotton waste- 2 kg, Cora cloth – 5 Mtrs • Foundation bolts and leveling plates.	1 set each

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta and Palestine Polytechnic University (PPU), Palestine			
Ref No. Encl. 101/2 of Annex II, Encl. 3/3 of Annex II, Encl. 29/4 of Annex II, Encl. 29/2 of Annex VII			
Sl. No.	Item	Brief Specification	Quantity
1	**Pedestal Grinding Machine** with all standard accessories and Electrical suitable for **380V, 3Phase, 50Hz, AC supply** and control Voltage 220V, 1 phase AC supply. (MCB's to be used in place of fuses)		7
1	Major specifications		
	Double ended with dynamically balanced motor with wheel guards having removable end caves		
1.1	Centre distance between wheels	420 mm	
1.2	Height from Base to spindle centre	910 mm	
1.3	Wheel speed	2860 rpm	
1.4	Motor Power	0.6 kW	
1.5	Grinding Wheel size	200 x 25 x 19.05 mm	
1.6	Colour of the Machine:	Dual colour: Soft Grey (RAL-7035) and Himmel Blue (RAL-5015) Polyurethane Paint	
2	Required Accessories / Spares		
2.1	DOL starter		1 each
2.2	Spark protectors		1 set each
2.3	Spare vitrified bonded grinding wheels		5 nos each
2.4	Service Tool set		1 set each
3	Set of mechanical and electrical spare parts for 5 year normal operation. (Item wise quantity with price to be provided)		1 set each
4	Operation, Maintenance and spare parts manual		3 sets each
5	Items required for erection and commissioning	• Touch up paint - 1/2 litre each colour in airtight sealed containers, Paint brush ½" 1 no. for each colour • Initial fill of Hydraulic/Lubrication/Cutting Oil, if any in separate sealed containers. • Cotton waste- 2 kg, Cora cloth – 5 Mtrs • Set of anti vibration pads/Foundation bolts and leveling plates.	1 set each

Enclosure – III

Lot – 3 - Refrigeration & Air conditioning Trainer Equipment

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 1 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Quantity
1	**Refrigeration Test Rig – Trainer: -** To understand theory, constructional and operational features of refrigeration and to study its performance characteristics suitable for **1-Phase, 220 V, 50Hz AC** supply. (MCB's to be used in place of fuses)		1 No
	Major Specifications:		
1.1	Capacity	3000 K.Cal /hr.	
1.2	Tonnage	1 Ton	
2	**Purpose:**		
2.1	Identify components of an refrigeration unit		
2.2	State need for eco-friendly refrigerant gas		
2.3	Study of a typical refrigeration cycle		
2.4	Calculate COP at various loads		
2.5	To study the Refrigerant states at various stages.		
2.6	Calculate particular COP & comparing with Theoretical COP at various Loads		
3	**Requirements:**		
3.1	Hermetically sealed Compressor, Reputed Make		
3.2	Expansion device: Capillary		
3.3	Control chamber: Water tank, of 50 lit capacity. MOC: SS, 16 SWG, inner as well as outer casing, with 40 mm insulation. The chamber to have the following facilities • Arrangement to drain water • Arrangement to mount stirrer • Arrangement to house evaporator coil • Arrangement to mount electrical heater • Arrangement to house temperature Sensor		
3.4	Rotameter : To measure refrigerant flow		
3.5	Evaporator: Water cooled type made of copper pipe		
3.6	Electrical Heater to load the system: 1.0 kW		
3.7	Electronic Energy-meter for recording power consumption.		
3.8	Temperature Indicator (8 point) with 8 nos. of Pt100 sensors.		
3.9	Pressure gauges panel mounted, back connection type (Digital Type)		2 Nos
3.10	H.P. / L.P cut out		
3.11	Refrigerant: R 134A		
3.12	Structure: Made of suitable MS square section & Powder coated.		
3.13	Structure size: 720 (W) X 1830 (H) X 500 (D) mm approximately.		
3.14	Schematic diagram: To be enclosed in Manuals		
3.15	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Colour	Standard Colour	
5	Operating manual containing Basic theory, Procedure to conduct experiment and troubleshoot.		3 sets
6	Recommended spares for 5 years of normal operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 2/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Walk-in Cooler Trainer: The trainer is designed to understand theory, constructional and operational features of refrigeration and to study its performance characteristics suitable for **1-Phase, 220 V, 50Hz AC** supply. (MCB's to be used in place of fuses).		1 No.
1	**Major specifications**		
1.1	Capacity	3000 Kcal/hr	
1.2	Chamber Size	72" (H) X 60 " (W) X 60" (D)	
1.3	Doors	1 no.	
1.4	Chamber Construction	Made up of GI PUFF panel with 3" thick insulation	
1.5	Refrigerant suitable for	R134A	
1.6	Bulkhead	Bulkhead light with switch	
1.7	Room Construction	The room should be equipped with tiered cantilevered shelving, 3 shelves on one wall. Depth of each tray should be 8" and distance between two trays should be 24".	
1.8	Cold Room	Cold room should be equipped with one (1) semi-rebated hinged door completely with heavy duty hinges and lockable door handle. Vision panel in doors to view the contents without opening the door. Flooring with Aluminium Checker sheet.	
2	**Purpose**		
2.1	To identify components of a Walk-in Cooler unit		
2.2	To study of a typical refrigeration cycle		
2.3	To calculate COP at various loads		
3	**Required Components in the System**		
3.1	Compressor: Hermetically sealed; Reputed make		
3.2	Expansion device: Capillary		
3.3	Control chamber: Size: 72" (H) X 60 "(W) X 60" (D), made of GI Puff panel Sheet with 3" thick insulation This chamber has doors for accessibility. Outside material GI, Inside material: GI with Antiskid Aluminium floor		
3.4	Rotameter to measure refrigerant flow		
3.5	Evaporator		
3.6	Electrical Heater to load the system: 1.0kW.		
3.7	Temperature Indicator (8 point) with Pt100 sensors.		8 nos
3.8	Pressure gauges - Panel mounted, back connection type of Reputed make		2 nos.
3.9	H.P. / L.P cut out arrangement		
3.10	Schematic diagram: To be enclosed in Manuals.		
3.11	**All instrumentation housed in a control panel with line diagram and provision for flow chart**		
4	Operating manuals containing Basic theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Ref No. Enclosure – 3/2 of Annex II				
Sl. No.	Item	Brief Specification		Qty.
	Condensing Unit Trainer: The trainer is designed to understand theory, constructional and operational features of condensing Unit suitable for **1-Phase, 220 V, 50Hz AC** supply. (MCB's to be used in place of fuses).			1 No.
1	**Major specifications**			
1.1	Capacity	1500 K.Cal/hr		
1.2	Compressor mounted	Hermetically sealed compressor with all electrical accessories		
2	**Purpose**			
2.1	To study & identify components of Condensing Unit and state of its use.			
3	**Required Components in the System**			
3.1	Compressor: Hermetically sealed of reputed make			
3.2	Air cooled condenser			
3.3	Facility to attach the unit to an evaporator of suitable capacity.			
3.4	Schematic Diagram to be enclosed in Manuals			
3.5	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**			
3.5	Pressure gauges, panel mounted, back connection type, Pressure gauge at the suction and discharge of the compressor, one no. each Digital			
3.6	Temperature Indicator (8 point) with 4 nos. of Pt100 sensors Digital			
3.7	Refrigerant: R134a			
3.8	Facility to charge and recover refrigerant gas very easily using a flared connection and a valve.			
3.9	Structure: Made of suitable MS square section & Powder coated.			
4	Operating manuals containing Basic theory, Procedure to conduct experiments and troubleshooting			3 Sets
5	Colour	Standard Colour		
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided		1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.		1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Ref No. Enclosure – 4/2 of Annex II				
Sl. No.	Item	Brief Specification		Qty.
	Cut Section Model: The model has to be made out of used compressors. Section to take in such a way as to expose maximum parts such as piston, cylinder, motor winding, etc. are displayed. This helps show the internal constructional details of the compressor. Exposed parts are suitably painted with a colour code.. Sections should be anodized.			3No.s (1 No. each type)
1	**Major specifications**			
1.1	Type-1	***Hermetically Sealed Compressor***		
1.2	Type-3	***Open type compressor***		
1.3	Type-2	***Semi-sealed compressor***		
2	**Purpose:** To study & identify components of Refrigeration Compressor Unit.			
3	Model shall be mounted on a structure made of suitable MS square section & Powder coated.			
4	Operating & Parts manuals			3 Sets
5	Colour	Standard Colour		
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.		1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 5 & 6/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Heat Exchanger: The trainer is designed to understand theory, constructional and operational features of different types of heat exchanger suitable for **1-Phase, 220 V, 50Hz AC** supply. (MCB's to be used in place of fuses).		1 No.
1	**Major specifications**		
1.1	Type – 1	Shell and Tube Type Heat exchanger	
1.2	Type – 2	Tube in tube type heat exchanger	
1.3	Flow Arrangement	Hot and cold water arrangement with pumps	
1.4	Two different type of heat exchangers can be used to carry out experiments using common mother unit		
1.5	One heat exchanger is supplied for assembly and disassembly practice.		
2	**Purpose**		
2.1	To state and identify different types of heat exchangers		
2.2	To identify components of a heat exchanger		
2.3	To carry out servicing and preventive maintenance of a heat exchanger		
3	**Required Components in the System**		
3.1	Mother unit: The unit should consists of, Glass tube Rotameter 0 to 1000 LPH for hot and cold-water flow rate measurement, 1 no. each 8 point Digital temperature indicator with sensors at suitable locations to be provided. Sump tank of 100 lit capacity, MOC: SS 304, 16 SWG 1 No. Water circulation pumps: Centrifugal type, 0.5 HP, 1000 LPH, 2 nos. Make:Reputed Electrical water heater: 3 KW, in line type. Electrical control panel complete with necessary switches, wiring and digital display. Structure: Made of suitable MS square section & Powder coated.		
3.2	Shell and Tube Type Heat exchanger: Made in borosilicate glass with 5" dia shell and tubes of 12mm dia 600mm long each. Area (0.5sq.m), Number of tubes 25, Connections for hot and cold water in shell and tubes respectively.		
3.3	Tube in tube type heat exchanger: MOC: Copper for inner pipe. Inner pipe diameter: 20 mm		
3.4	Piping: PPR with SS embedded threading		
3.5	Multi pass heat exchanger for assembly- disassembly practice: MOC: SS 304, Floating head (Pull through type) Shell and tube (1-2) type heat exchanger 6" dia shell with copper tube ½" dia and 600mm length. number of tubes 25, segmental baffles 25% cut.		
3.6	Toolkit required to assemble- disassemble Multi pass heat exchanger and its three spare gasket set.		
3.7	Steel wire brush for cleaning inside the heat exchanger shell & Scraper for cleaning outside of tubes		
4	Operating manuals containing Basic Theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set
	All instrumentation housed in a control panel with line diagram and provision for flow chart.		

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 7/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Refrigeration Tutor: The trainer is designed to understand theory, constructional and operational features of refrigeration and to study its performance characteristics suitable for **3-Phase, 380 V, 50Hz AC** supply.(MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Capacity	3000 K.cal/Hr.	
1.2	Tonnage	1 Ton	
2	**Purpose**		
2.1	To identify components of an refrigeration unit		
2.2	To state the need for eco-friendly Refrigerant gas		
2.3	TO study of a typical refrigeration cycle		
2.4	Calculate COP at various loads		
3	**Required Components in the System**		
3.1	Hermetically Sealed Compressor		
3.2	Expansion device: Thermostatic Expansion Valve		
3.3	Control chamber: Water tank of 50 lit capacity. MOC: SS, 16 SWG, inner as well as outer casing, with 40 mm insulation. This chamber has following facilities Arrangement to drain water Arrangement to mount stirrer Arrangement to house evaporator coil Arrangement to mount electrical heater Arrangement to house temperature Sensor		
3.4	Rotameter to measure refrigerant flow		
3.5	Evaporator: Water cooled type made of copper pipe		
3.6	Electrical Heater to load the system: 1.0 kW.		
3.7	Electronic Energy-meter for recording power consumption.		
3.8	Temperature Indicator (8 point) with Pt100 sensors.		8 No.s
3.9	Pressure gauges, panel mounted, back connection type Digital		2 No.s
3.10	H.P. / L.P cut out		
3.11	Refrigerant: **R134A**		
3.12	Structure: Made of suitable MS square section & Powder coated.		
3.13	Structure size: 720 (W) X 1830 (H) X 500 (D) approximately.		
3.14	Schematic Diagram to be enclosed in Manual.		
3.15	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing Basic theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 8/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Package Air Conditioner: Designed to understand theory, constructional and operational features of package air conditioner and to study its performance characteristics suitable for **1-Phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Capacity	3000 K.cal/Hr.	
1.2	Tonnage	1 Ton	
1.3	Air Circulation	638 m3/Hr. approx.	
2	**Purpose**		
2.1	To identify components of an air-conditioning unit		
2.2	To state need for eco-friendly refrigerant gas		
2.3	To study of a typical air-conditioning unit.		
2.4	To study of cooling process		
2.5	To study of a typical air-conditioning cycle		
2.6	To calculate COP at various loads		
2.7	To study Psychometric charts		
3	**Required Components in the System**		
3.1	Hermetically sealed Compressor		
3.2	Capillary		
3.3	Test chamber and ducting: The chamber will be made of MS powder coated sheet. There will be ducting in the ceiling (top) part of the chamber for cold air inlet. Removal (exhaust) ducting will be on all sides of the test chamber. The chamber will be of 4' x 4' x 4' or more. The test chamber will have a door. On the door a transparent window will be provided to view interior chamber. Houses sensors, thermostats and axial fan		
3.4	Rotameter to measure refrigerant flow rate		
3.5	Evaporator		
3.6	Electrical Heater to load the system:1.5 kW with facility to vary the load		
3.7	Electronic Energy meter for recording power consumption		
3.8	Temperature Indicator (8 point) with sensors, 8 nos.		
3.9	Pressure gauges, 2 nos. Digital		
3.10	Anemometer with digital indicator, (Portable)		
3.11	Digital LH/ RH indicator		1 set
3.12	H.P. / L.P cut out		
3.13	Refrigerant: Eco-friendly R 134A.		
3.14	Control panel made of MS Structure		
3.15	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing Basic theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 9/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Automobile Air Conditioner Trainer: - The trainer is designed to understand theory, constructional and operational features of an automobile air conditioner and to study its performance characteristics suitable for **3-Phase, 380 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Model/ Make	Using original car air-conditioner components	
2	**Purpose**		
2.1	To identify components of automobile air-conditioning unit		
2.2	To state need for eco-friendly refrigerant gas		
2.3	To study of cooling process		
2.4	To study of a typical air-conditioning cycle		
2.5	To study Psychometric charts		
3	**Required Components in the System**		
3.1	Car AC compressor – NEW Systems		
3.2	Electrical motor of ISI standard with VFD to vary the speed of the motor to simulate engine speed varying condition		
3.3	Wobble plate compressor mounting on brackets Capillary		
3.4	Evaporator		
3.5	Condenser		
3.6	AHU and Fan motor		
3.7	Hose tubes, receivers & expansion controls complete as per compressor		
3.8	Electric component & wiring harness		
3.9	Converter AC 220V to 12V DC		
3.10	Ammeter and Voltmeter		
3.11	Temperature Indicator (8 point) of Pt100 sensors.		8 Nos
3.12	Pressure gauges, panel mounted, back connection type Digital		2 Nos
3.13	Electrical heater to load the system. Arrangement to vary the load.		
3.14	Structure: Made of suitable MS square section & Powder coated.		
3.15	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing Basic Theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 10/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Split Type Air Conditioning Tutor: The trainer is designed to understand theory, constructional and operational features of split air conditioner and to study its performance characteristics suitable for **3-Phase, 380 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Capacity	4500 K.cal/Hr.	
1.2	Tonnage	1.5 Ton	
1.3	Moisture removal	1 Lit/hr	
1.4	Air Circulation:	638 m3/hr approx.	
2	**Purpose**		
2.1	To identify components of a split air-conditioning unit		
2.2	To study typical air-conditioning unit.		
2.3	To study cooling process		
2.4	To study the Summer, Winter and Monsoon air-conditioning process		
2.5	To study dehumidification and cooling process		
2.6	To calculate COP at various loads		
2.7	To study Psychometric charts		
3	**Required Components in the System**		
3.1	Hermetically sealed Compressor		
3.2	Capillary		
3.3	Control chamber and ducting houses sensors, thermostats and evaporator unit		
3.4	Rotameter to measure refrigerant flow		
3.5	Measuring vessel to measure water condensed at dew point conditions		
3.6	Evaporator unit		
3.7	Electrical Heater 3.0kW to load the system.		
3.8	Humidifier: Steam generation by using electrical heater		
3.9	Electronic Energy-meter for recording power consumption		
3.10	Temperature Indicator (8 point) with sensors		8 Nos
3.11	Pressure gauges Digital		2 Nos
3.12	Anemometer with digital indicator(Portable)		
3.13	Digital RH indicator		2 Nos
3.14	H.P. / L.P cut out		
3.15	Refrigerant Suitable for: R22/R134a		
3.16	MS test chamber with Acrylic door		
3.17	Control panel made of MS structure		
3.18	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing Basic Theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 11/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Air Conditioning Tutor: - Designed to understand theory, constructional and operational features of air conditioner and to study its performance characteristics suitable for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Capacity	3000 K.cal/Hr.	
1.2	Tonnage	1 Ton	
1.3	Moisture removal	1 Lit/hr	
1.4	Air Circulation:	638 m3/hr approx.	
2	**Purpose**		
2.1	To identify components of an air-conditioning unit		
2.2	To state need for eco-friendly refrigerant gas		
2.3	Study of a typical air-conditioning unit.		
2.4	Study of cooling process		
2.5	Study of Summer, Winter and Monsoon air-conditioning process		
2.6	Study of dehumidification and cooling process		
2.7	Study of a typical air-conditioning cycle		
2.8	To calculate Heat balance at evaporator, condenser and the overall system		
2.9	To calculate COP at various loads		
2.10	To study Psychometric charts		
3	**Required Components in the System**		
3.1	Hermetically sealed Compressor		
3.2	Capillary		
3.3	Control chamber and ducting houses sensors, thermostats and axial fan		
3.4	Rotameter to measure refrigerant flow		
3.5	Measuring vessel to measure water condensed at dew point conditions		
3.6	Cooling coil evaporator		
3.7	Electrical Heater to load the system – 1.5 kW with facility to vary the load.		
3.8	Humidifier: Steam generation by using electrical heater		
3.9	Electronic Energy-meter for recording power consumption		
3.10	Temperature Indicator (8 point) with sensors		8 Nos
3.11	Pressure gauges Digital		4 Nos
3.12	Anemometer with digital indicator, (Portable)		
3.13	Digital LH/RH indicator		1 set
3.14	H.P. / L.P cut out		
3.15	Refrigerant: Eco-friendly Refrigerant, R134A		
3.16	MS test chamber with Acrylic door		
3.17	Control panel made of MS and foam sheet.		
3.18	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing Basic theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 12/2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Room Air Conditioning Tutor: - Designed to understand theory, constructional and operational features of air conditioner and to study its performance characteristics suitable for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Tonnage	0.75 Ton	
1.2	Moisture removal Capacity	Suitably designed	
2	**Purpose**		
	Study of Comfort Zone		
2.1	To identify components of an air-conditioning unit		
2.2	To state need for eco-friendly refrigerant gas		
2.3	Study of a typical air-conditioning unit.		
2.4	Study of cooling process		
2.5	Study of Summer, Winter and Monsoon air-conditioning process		
2.6	Study of dehumidification and cooling process		
2.7	Study of a typical air-conditioning cycle		
2.8	To calculate Heat balance at evaporator, condenser and the overall system		
2.9	To calculate COP at various loads		
2.10	To study Psychometric charts		
3	**Required Components in the System**		
3.1	Hermetically sealed Compressor		
3.2	Capillary		
3.3	Control chamber and ducting houses sensors, thermostats and axial fan		
3.4	Rotameter to measure refrigerant flow		
3.5	Measuring vessel to measure water condensed at dew point conditions		
3.6	Cooling coil evaporator		
3.7	Electrical Heater to load the system – 1.0 kW with facility to vary the load.		
3.8	Humidifier: Steam generation by using electrical heater		
3.9	Energy-meter for recording power consumption		
3.10	Temperature Indicator (8 point) with sensors		8 Nos
3.11	Pressure gauges		4 Nos
3.12	Anemometer with digital indicator, (Portable)		
3.13	Digital LH/RH indicator		1set
3.14	H.P. / L.P cut out		
3.15	Refrigerant: Eco-friendly Refrigerant, R 134A		
3.16	Test chamber and ducting: The chamber will be made of MS powder coated sheet. There will be ducting in the ceiling (top) part of the chamber for cold air inlet. Removal (exhaust) ducting will be on all sides of the test chamber. The chamber will be of 4' x 4' x 4' or more. The test chamber will have a door. On the door a transparent window will be provided to view interior chamber.		
3.17	Control panel made of MS structure		
3.18	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing Basic Theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 124 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Evacuating & Refrigerant Charging Station - Designed to understand theory, constructional and operational features of the system and to study its performance characteristics for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses).		1 No.
1	**Major specifications**		
1.1	Pump type	Vacuum Pump	
1.2	Pump construction	Two Stage Rotary pump with gas ballast & anti suck back.	
1.3	Capacity up to Vacuum can be handled	1000 microns of Hg	
1.4	Other important mountings	Graduated charging cylinder	
2	**Requirements of the System**		
2.1	All mountings such as Manifolds, valves, gauges and all necessary isolating valves shall be suitable to the system.		
2.2	All necessary arrangements has to be made for measurement of evacuated & charged systems such as weighing machine, Temperature gauge, Pressure gauge & etc.		
2.3	All safety mountings has to be mounted on the system against leakage of Refrigerants.		
2.4	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
2.5	All the Gauges, Valves, Manifolds shall be of Reputed make		
3	Operating manuals containing basic theory, procedures to carry out the evacuation & Charging the Refrigeration system.		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta Plastic Processing Unit, Hebron, Palestine			
Ref No. Enclosure – 126 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Two Stage Rotary Vacuum Pump - Designed to understand constructional and operational features of the system and to study its performance characteristics for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses).		1 No.
1	**Major specifications**		
1.1	Pump type	Two Stage Water-Ring type pump	
1.2	Capacity	60-100 LPM (Approx.)	
1.3	Evacuation Capacity	50 microns of Hg	
1.4	Other important mountings	gas ballast anti suck valve	
2	**Requirements of the System**		
2.1	All mountings such as valves, gauges shall be suitable to the Pump design.		
2.2	All necessary arrangements has to be made for measurement operational parameters such as Pressure gauges, Temperature gauges & etc.		
2.4	All the Gauges, Valves shall be of Reputed make		
3	Operating manuals containing basic theory & procedures to carry out the operations		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 137 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Window Air Conditioner - Designed to understand constructional and operational features of Window Air Conditioner and to study its performance characteristics suitable for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Capacity	3000 K.cal/Hr.	
1.2	Tonnage	1 Ton	
1.3	Compressor Capacity	12000 BTU/Hr	
1.4	Air Circulation:	500 CFM	
1.5	Efficiency Ratio	10 EER – BTU/Hr/W	
1.6	Refrigerant suitable for	R 22	
2	**Purpose**		
2.1	To identify components of an Window air-conditioning unit		
2.2	Study of cooling process		
2.3	Study of dehumidification and cooling process		
2.4	Study of a typical air-conditioning cycle		
3	**Requirements of the System**		
3.1	Hermetically sealed Compressor		
3.2	Auto air swing evaporator : Blue fins		
3.3	LCD Operating panel display		
3.4	Charged - Ready to work condition		
3.5	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
3.5	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
4	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 141 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Ice Candy Unit - designed to understand theory, constructional and operational features of Ice Candy Unit and to study its performance characteristics suitable for **Single Phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Capacity	3000 K.cal/Hr.	
1.2	Tonnage	1 Ton	
1.3	Refrigerant suitable for	R 404A	
1.4	Minimum Temperature to achieve	- 18 °C	
2	**Purpose**		
2.1	To identify components of Ice Candy Unit		
2.2	To study the process		
2.3	To calculate COP at various loads		
3	**Requirements of the System**		
3.1	Hermetically sealed Reciprocating Compressor		
3.2	Condenser – Air cooled type with fan		
3.3	Evaporator – Copper coil immersed into tank.		
3.4	H.P. / L.P cut out		
3.5	Liquid line drier		
3.6	Accumulator		
3.7	Temperature Indicator s		
3.8	Pressure gauges Digital		
3.9	Thermostatic Expansion valve & Solenoid valve to control candy mould box		
3.10	SS tank, mould box, candy with puff insulated SS body, with agitator motor etc... 314 grade		
3.11	Control panel shall consist of, Thermostat, Pressure Gauges, Safety controls, Digital Temperature Indicator, Digital Voltmeter, Digital Ammeter & other controls.		
3.12	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
4	Operating manuals containing basic theory, Procedure to conduct experiments and troubleshooting		3 sets
5	Colour	Standard Colour	
6	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
7	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 142 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Air Conditioning plant - Working Trainer Model Simulator with all controls including humidity control suitable for **3 Ph, 380V, 50Hz AC** Supply (MCBs are to be used in place of fuses)		1 No.
1	**Major specifications**		
1.1	Type	Direct & indirect water chiller	
1.2	Capacity	15000k.cal/hr	
1.3	Dimensions (L x D x H)	1200 L x 750 D x 1800 H mm	
2	**Purpose**		
2.1	Experimental Air-conditioning plant to conduct experimental to determine the co-efficient of performance of the unit		
3	Required Components in the System		
3.1	Compressor : 5 ton hermetically sealed reciprocating compressor		
3.2	Air cooled condenser: Forced Type with fan		
3.3	Tube material: 19mm OD integrally finned copper tube 19TPI		
3.4	DELETED		
3.5	Water in / out 1 ¼" BSP		
3.6	Evaporator: 15000k cal AHU-for indirect water chiller and DX indoor unit 15000k. for direct .Shell & Tube Chiller 5 Ton capacity with Pump and accessories. Chill water tank provision to be provided.		
3.7	Blower size: 300 x 300 mm		
3.8	Motor Rating: 0.75 KW		
3.9	Refrigerant : R-22		
3.10	Water cooling tower complete with fan		
3.11	Control: HP/LP cutout switch		
3.12	Complete installation & Gas charging with running condition		
3.13	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		
3.14	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting		3 sets
3.15	Colour - Standard		
4	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
5	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 143 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Condensing unit with open type compressor air cooled condenser controls etc suitable for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	Condensing unit with open type compressor air cooled condenser. Compressor: Open reciprocating Type, belt driven, Cap 3000 k.cal/hr. Refrigerant R-22,, R-134a,or CFC free valve Suction & discharge service valve, Compressor Motor 2HP, 1Ph, 220V, 50Hz, AC. Condenser size: 16" x 16" - 4 row Internally grooved copper 3/8" tubing with aluminium air fins -side, top and bottom plates of 16SWG. Aluminium condenser Fan motor 1/5HP, 1Ph, 220V, 50Hz,AC, condenser fan blade 14" diameter of Aluminium, Receiver suitable with angle valve 2 nos. (Inlet & Outlet), Cooling coil size 13"x 13" - 3 row-internally grooved copper tube 3/8"with aluminium air fins - side, top and bottom plates of 16SWG aluminium, or suitable for AC type cooling coil with metering device thermostatic expansion valve. Acrylic duct 14"x14" - 4 ft long, 8 mm thick, with orifice plate, inclined manometer, axial fan, air heater, steam inlet facility, dry bulb and wet bulb temperature sensors at inlet & outlets. Suitable insulation of Armocol provided wherever necessary. Rotometer to measure the flow rate of liquid refrigerant and bypass the rotometer - 1 no. Air flow measurement digital Anemometer control panel which consists of the following items mounted on it: 8 channel programmable digital scanner for temperature indication of various points. Temperature controlling thermostat, DOL starter switch for compressor, Switches and indication lamps for steam generator, Axial flow fan, Heater, Mains HP and LP cut off switch, Digital ammeter, Voltmeter, 1 no each, Pressure gauge 4 nos, process line diagram. The unit to be able to perform the following measurement/practical trade. 1) Dry bulb & wet bulb temperature of Air inlet & outlet of cooling coil duct. 2) Suction & Discharge pressure of compressor. 3) Inlet & outlet pressure of cooling coil. 4) Flow rate of refrigerant at liquid line. 5) Pressure drop at duct inlet (Orifice). NOTE: The unit should be complete with gas charging and working condition of AC system. The whole unit mounted on painted/powder coated MS steel frame.		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set
7	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Ref No. Enclosure – 144 / 2 of Annex II			
Sl. No.	Item	Brief Specification	Qty.
	Condensing unit with open type compressor evaporator condenser controls etc controls etc suitable for **Single phase, 220 V, 50Hz AC** supply. (MCBs to be used in place of fuses)		1 No.
1	**Major specifications**		
	Condensing unit with open type compressor evaporator condenser. Compressor: Open reciprocating Type, belt driven, Cap 3000 k.cal/hr. Refrigerant R-22,, R-134a,or CFC free valve Suction & discharge service valve, Compressor Motor 2HP, 1Ph, 220V, 50Hz, AC. Condenser size: 14" x 14" - 4 row Internally grooved copper J" K tubing with aluminium air fins -side, top and bottom plates of 16SWG Aluminium. Receiver suitable with angle valve 2 nos. Cooling coil size 13"x 13" - 3 row-internally grooved copper J" K tubing with aluminium air fins - side, top and bottom plates of 16 SWG aluminium, or suitable for AC type cooling coil with metering device thermostatic expansion valve. Cooling coil motor: 1/10 HP, 1Ph, 220V, 50Hz, AC, with 15" aluminium blade. Evaporative Type: Suitable evaporative condenser cooling tower made of FRP or 8 mm thick transparent acrylic with drift eliminator, spray nozzle, inlet and outlet wet bulb, dry bulb temperature sensors. Evaporator blower: Suitable for 1Ph, 220V, 50Hz, AC.(Cooling Tower - Forced draft type)		
2	Total system shall be built in such a way that total processes & Components of the entire system can be demonstrated.		
3	Operating manuals containing Theory, Procedure to conduct experiments and troubleshooting		3 sets
4	Colour	Standard Colour	
5	Recommended spares for 5 years of normal Operation	Item wise quantity with price to be provided	1 set
6	Items required for commissioning at site	Touch up paint, Brush etc. – Required qty.	1 set
7	**All instrumentation housed in a control panel with line diagram and provision for flow chart.**		

Lot –4 - Refrigeration & Air Conditioning Tools & Equipment

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Enclosure No.**	**Description**	**Brief Specification**	**Detailed Specification**	**Qty**
1	1/156	134A Refrigerant in cylinders with valves	FLORON Brand 134A gas (Tetra Flouro Ethane) in 10kg company sealed cylinder. Dupont Brand 134A can 340 gms	Capacity - 10 Kg - 1 No. with test Certificate 340 gr. Disposable refrigerant Cans (Dupont / Floron) - 2 NO.s	2
2	1/191	Accessories thormostatic expansion valve distributors, driers, (pencil solid core type etc.) accumulators, receivers, bellows type thermostat, HP Stat & LP Stat humidi stat, solenoid valves	DANFOSS make , Orifice No:3, R 22, Model: TX 2 Dryall / Denyo Make Dryall / Denyo Make MB Make(for 134A gas) 10grams,15 grams,25grams Annapurna Make Danfoss make KP5 Model Danfoss make KP1 Model Danfoss make KP15 Model Temptec thermo hygrometer clock	Thermostatic Expansion Valve with separating orifice (Removable Orifice) Danfosss Make; 5 Ton Capacity. Distributor(Refrigirant for 5 Ton) Drier : (Core type) for 5 Ton cap Accumulator : 5 Ton capacity Liquid Reciever : 5 Ton cap Pencil type Drier; Bellow type Thermostat HP Cutout: Danfoss make LP Cutout : Danfoss make HP & LP Cutout (combined) with manual restart - Danfoss make Humidystat : Reputed make Solenoid Valve : 1/4" size	1
3	1/179	Acid test kit		With acid resistant centrifugal pump 1/2 HP capacity	1
4	1/127	Anemometer	Vane type	Reputed make	1
5	1/185	Ball Valves service valves hand shut valves	1/4" to 7/8" Bava make hand shut off valve, service valve	Reputed make	2

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Sl. No	**Enclosure No.**	**Description**	**Brief Specification**	**Detailed Specification**	**Qty**
			Threads protected		
6	1/182	Brazing alloy rods for 1/4" to 7/8" tubes Cu to cu, Cu to steel, Cu to brass and appropriate fluxes	Copper Brazing rod Silver rod Brass rod	Cu - Cu: Cu alloy rod 2kg, 1/8" size CU – Steel: Silver 43% rod; 100 gr; 1.2mm dia Cu - Brass: Brass-Ni rod 1/4kg; 3mm dia	1
7	1/174	Circulating water pump	1/2 HP Capacity	Monoblock 1 Ph, 220V 50Hz, Reputed make	1
8	1/170	Components of Car AC systems.	a) Wobble plate compressor with mounting brackets. b) Serpentine evaporator. c) Parallel flow condenser. d) Hoses, tubes, receive, expansion valve. e) Electrical components & wiring harness		1
9	1/38	Compound gauge diameter 63 mm with recalibration set screw scale vacuum 76 mm pressure 15 Kg/Sq.cm		Airmaster make with SS Body (-)30 to 150 PSI - 2 NO.s 0-300 PSI - 2 NO.s (Glycerene/Oil filled 1 No. each)	4
10	1/187	Compressor tester for small hermetic compressor	Electrical panel with voltmeter,ammeter,relays and capacitor, MCB etc.	Reputed make	1
11	1/171	Condenser - Shell and tube	Small capacity. Reputed Make	1.5 Ton capacity with valves	1
12	1/138	Cooler- bottle	110 litre 1/6 HP	Voltas/Bluestar/Carrier make	1
13	1/193	Cooler-Visi	165 litres	Voltas/Bluestar/Carrier make	1
14	1/140	Cooler-water	Storage type 40 litres capacity	Voltas/Bluestar/Carrier make	1
15	1/139	Cooler-water	Instantaneous type - 40 litres capacity.	Voltas/Bluestar/Carrier make	1
16	1/136	Deep freezer	165 Litre (–)18 Deg C1/4 HP	Voltas make	1
17	1/125	Dial thermometer remote controls armoured capillary dial 75 mm-50		Reputed make	2

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Enclosure No.**	**Description**	**Brief Specification**	**Detailed Specification**	**Qty**
18	1/164	Dry N2 in cylinder with 2 stage regulator or commercial N2 in cylinder with drier unit and 2 stage regulator	Standard capacity - ISI standard	with Cylinder	1
19	1/192	Electrical accessories current & potential relays start & run capacitors, PTC,s overload protector relays contractor.		1 Ph, 220V, 50Hz, AC - Reputed make	1
20	1/189	Evaporator of direct cooled refrigerator with capillary heat exchanger	1 T capacity finned type evaporator		1
21	1/190	Evaporator of Frost free refrigerator	200 litre capacity		1
22	1/172	Fan coil unit with water valves	(2 &3 way)	3 T capacity	1
23	1/168	Filter driers for CFC-12 & HFC-134 A for repairs retrofits	3/8" size	Dryall make	8
24	1/154	Fin straightener / Fin comb			42
25	1/14	Flaring tool set with Swedging	Single for tube 4.7 to 16 mm OD	ROTHENBERGER Make	4
26	1/167	Four way manifold with gauges		Rothenberger make;	1
27	1/41	Gas leak detector for halogen gas	Gas leak detector using halogen gas	Rothenberger make; 3gr/annum capacity	1
28	1/155	HC refrigerant in cylinder/ disposable containers	Dupont 134a , 340 gms	Or Reputed Make	2
29	1/188	Hermetic compressor	1.5 Ton	Tecumseh make	1
30	1/184	i) Hermetic compressor	1/2 HP(approx) for use in repair work of appliances for CFCs and HFCs	Tecumseh make	2
		ii) Hermetic compressor	For 134A	Tecumseh make	3
31	1/161	No frost refrigerator 300 litre capacity using HC refrigerant	Frost free refrigerator, 2 door, 1Ph, 220V, 50Hz, AC	Godrej Make	1
32	1/183	Pilot tube & inclined tube manometer	500 m length, pilot tube, with fittings and inclined tube manometer, transparent acrylic scale.	from reputed mfrs.	1
33	1/163	Portable Air-LPG brazing kit with 2 Kg LPG cylinder, torches, houses, standard make.a) With straight flame. b) With Cyclone / swirl jet flame.	Portable Air-LPG brazing kit with 2 kg LPG cylinder, torches, hoses - Standad make. 1) with straight flame. 2) With cyclone swirl jet flame.	Rothenberger/Reputed make	1

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Enclosure No.**	**Description**	**Brief Specification**	**Detailed Specification**	**Qty**
34	1/132	Pressure testing tank with lighting arrangement pressure gauge (0-35 Kg / sq.cm) double stage	Suitable Pressure testing tank of SS 304 Grade 18 Gauge having TIG welded joints with lighting arrangements. Pressure gauge 0-35 kg/cm2 - double stage		1
35	1/186	Quick couplers process tube adaptor	1/4" to 7/8"		2
36	1/145	Refrigeration system with provision of capacity control etc, for demonstration	Capacity 9000 K. cal/hr semi hermetic / open type.	Semi hametic/open type	1
37	1/157	Recovery unit one each for CFC & R134 A refrigerants with recovering cylinders.	Consisting of 1/6 HP or required capacity compressor condensor with fan, oil separator, accumulator valve inlet and outlet for gas recovery, compound gauges and pressure gauges with LP, HP cut outs individual unit for CFC & HFC.	Rothenberger / Reputed make	1
38	1/194	Recycling Unit		Suitable	1
39	1/180	Refractometer	Portable with lens		1
40	1/160	Refrigerator 170 litre using 134 A refrigerant	Single door refrigerator	Voltas/Bluestar/LG/ Samsung/Godrej Make	1
41	1/134	Refrigerator compressor type	165 litre	Voltas/Bluestar/LG/ Samsung/Godrej Make	1
42	1/135	Refrigerator compressor type	300 litres double door, double compressor system	Reputed make	1
43	1/158	Reverse cycle AC/Heat pump	3000 K.cal/hr. Or 4500 K.cal/hr.		1
44	1/169	Sealed ex-proof components for use in HC appliances: Thermostats Sealed OLPS solid state PTC's door switches lamp holders	Thermostats sealed OLPS solid state PTCs door switches lamp holder.	Godrej Make	4
45	1/173	Shell and tube DX chillers (Small)	5 Ton capacity	Reputed make	1
46	1/159	Split type AC 4500 K.cal/hr	With indoor unit & outdoor units and electronic remote control	Voltas / Reputed make	1
47	1/165	Trichlorethylene bottle	700 ml		1
48	1/166	Two way manifold with gauges	Rothenberger make, Standard Manifold set.		1
49	1/122	Refrigerant cylinder	Capacity 2.5 Kg		2

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Enclosure No.**	**Description**	**Brief Specification**	**Detailed Specification**	**Qty**
50	1/123	Refrigerant cylinder	Capacity 30 Kg		2
51	1/120	Feeler gauge	0.05 mm-1 mm		1
52	1/133	Heating Kit with infra red bulb	150 watt capacity		1
53	1/152	Micron vacuum gauge	Capable of reading upto 20 microns		2
54	1/37	Pressure gauge diameter 63 mm with recalibration set screw scale vacuum 76 mm pressure			4
55	1/178	Schraeder valve core removal tool			1
56	1/44	Scissor gasket cutting stainless steel	length 25 mm		4
57	1/153	Sensor thermometer	Digital		2
58	1/39	Serviceman thermometer in metal case	-30 to + 30 Deg.C.		2
59	1/131	Spray outfit “V” twin with motor 1/2 HP delivery upto 120 Litre free air pressure upto 3 Kg/Sq.cm with spray gun and fitting			1
60	1/15	Swedging tool	Punch type set of size, for tube 4.7 to 16 mm OD		4
61	1/16	Swedging tool	Screw type, with adapter set of size for tube 4.7 to 16mm OD		1
62	1/22	Capillary plug gauge			2
63	1/35	Valve key-T-Handle	4.7 & 6.4 mm Sq		4
64	1/40	Sling psychrometer mounted on aluminum / plastic back scale –50 Deg. C to + 50 Deg.C			1

Enclosure – V

Lot – 5 - Electrical Machine Trainer

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
1.	**Encl-4/1, A-II**	**Electrical Machine Trainer**	**a. Electrical Machine Trainer** with powder coated sturdy table top Aluminum flat demo panel system of dimension 1150-1190 mm x 280 – 310 mm x 940 – 1000 mm, carrying the various high voltage components housed in panel and essential accessories and following 300W chassis mounted machines (8 Nos.) **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz 1) DC Integrated m/c mounted as Dynamometer & with speed/torque sensor acts in also as prime mover / loading machine 2) 3 phase AC integrated 300W m/c chassis mounted 3) 1 phase AC Integrated 300W motor chassis mounted 4) 1 phase AC Integrated generator & Sync.300W M 5) Universal Motor AC/DC Integrated, 300W, Chassis mounted 6) Repulsion motor chassis mounted 7) Squirrel cage 3 phase AC 300W, 2 speed chassis mounted motor 8) 3 phase salient pole synchronous Generator Features: • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. The Panel to house the following components: 1. Input 3 phase DOL Starter panel 2. Integrated AC 1 phase measurement panel 3. Star-Delta starter panel 4. 3 Phase wound Rotor & Sync. Motor panel 5. 1 phase Motor, Alternator & Sync. Motor Panel 6. DC voltmeter and DC ammeter panel 7. SCR Actuator (variable DC) cum sensor signal conditioning panel 8. Instrumentation Power supply cum and digital display panel 9. Resistor Load panel 10. LC Load panel 11. Variable AC & DC supply panel 12. Energy Meter panel **b. Accessories:** Should provide Patch Cord Set – 1No., Rheostat 200W – 1No., Hand held non contact Digital tachometer – 1No, Bidirectional power

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			meter & analyzer – 1No. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
1.1	**Encl-4/1, A-II**	**Work Table for Electrical Machine Trainer**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
2.	**Encl-4/2, A-II**	**Industrial Control Trainer**	**a. Industrial Control Trainer** with powder coated sturdy table top Aluminum flat demo panel system of modular structure carrying the various high voltage components housed in panel and essential accessories to facilitate easy and safe wiring by students, study of components in electrical systems and their operations, study of Hold ON Contact Logic, study of interlocking contact logics with trip indication , study of DOL starter logic, study of Star-Delta logic, study of phase reversal logic, study of Earth Leakage fault and tripping threshold & study of sequential logic to start motors in a process plant. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz Features: • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs.

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			• Facilitates easy and safe wiring by students. The Panel to house the following components: 1. Input 3 phase DOL Starter panel 2. Lamp load panel 3. 1 phase MCB isolator panel 4. Contractor panel 5. Over Load Relay panel 6. Push button panel 7. Proximity cum Limit switch panel 8. DC power supply panel 9. Relay panel **b. Accessories:** Should provide Patch Cord Set – 1No., Rheostat 200W – 1No., Hand held non contact Digital tachometer – 1No, Bidirectional power meter & analyzer – 1No. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
2.1	**Encl-4/2, A-II**	**Worktable for Industrial Control Trainer**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
3.	**Encl-4/3, A-II**	**3 Phase AC Motor Fault Simulator**	**a. 3 Phase AC Motor Fault Simulator** with powder coated sturdy table top Aluminum flat demo panel system of dimension 890 – 920 mm(L) x 280 – 320 mm(D) x 480-520 mm(H) carrying the various high voltage components housed in panel and essential accessories to study the following faults: 1) Over current 2) Under current 3) High temperature 4) Single phasing 5) Reverse phasing 6) Under voltage 7) Winding open **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			Features: • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. • Fault simulator to be built on the panel on top of motor shrouded under cover for carrying out the experiments. • Each panel has colorful screw less overlays showing circuit diagram & its connection tag numbers for easy understanding and connections. The Panel to house the following components: • Input 3 phase DOL Starter panel • AC voltmeter panel • AC ammeter panel • Start-Delta starter panel • 3 Phase sequence indicator panel Motor: 3 Phase squirrel cage induction motor 0.5 HP, 1500 RPM, 6 terminal motor to be provided. **b. Accessories:** Should provide Patch Cord Set – 1No., Rheostat - 1No., Hand held non contact Digital tachometer – 1No, Bidirectional power meter & analyzer – 1No. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
3.1	**Encl-4/3, A-II**	**Work Table for 3 Phase AC Motor Fault Simulator**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
4.	**Encl-4/4, A-II**	**House Wiring /Commercial wiring Installation Trainer**	**a. House Wiring / Commercial wiring Installation Trainer** with powder coated sturdy table top Aluminum flat demo panel system of modular structure carrying the various high voltage components housed in panel and essential accessories to facilitate easy and safe wiring by students, study of components in electrical systems and their operations, study of Hold ON Contact Logic, study of interlocking contact logics with trip indication , study of DOL starter logic, study of Star-Delta logic, study of phase reversal logic, study of Earth Leakage fault and tripping threshold & study of sequential logic to start motors in a process plant. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz <u>Features:</u> • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. The Panel to house the following components: • Input 3 phase DOL Starter panel • Lamp load panel • 1 phase MCB isolator panel • Contractor panel • Over Load Relay panel • Push button panel • Proximity cum Limit switch panel • DC power supply panel • Relay panel **b. Accessories:** Should provide Patch Cord Set – 1No., Rheostat 200W – 1No., Hand held non contact Digital tachometer – 1No, Bidirectional power meter & analyzer – 1No.

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			c. Instruction Manual: Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **e. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
4.1	**Encl-4/4, A-II**	**Work Table for House Wiring /Commercial wiring Installation Trainer**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
5	**Encl-4/5, A-II**	**Electrical Control Trainer**	**a. Electrical Control Trainer** of dimension 450-480 mm(W) x 150 – 170 mm(H) x 330 – 360 mm(D) containing Analog PID & with PC based PID controller with PID Software, Computer Interface Adapter & USB IO module. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz <u>Features:</u> • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. • Study of Analog PID and Digital PID. • Facility to monitor behavior of the PID output & process variable either on PC screen or on CRO. • PC based PID controller with P,PI,PID control. • To different processes using simulated building blocks as well as real life processes using replaceable experiment panels. • Graph printing facility. • Top board should contain Builtin Power supply and Digital display

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			unit. • Operating voltage: 220-240 V +10% <u>Analog PID Controller:</u> • Controller Selection: P,PI, PD, PID with slide switch • Built in Function Generator (Sine, triangular & square) • Test points for Process Error, Set Point, Measured Value, Controller output. <u>PC based PID Controller:</u> • PID software in CD form should be capable of installing on XP, WIN7 or latest windows OS systems. • PID controller mode with parameters like Integral Time, Derivative Time, Derivative Gain Kd etc. • Computer Interface Adapter to be provided to prevent damage to PC parallel port due to wrong connections. • USB IO module to be interface Computer Interface adapter to USB PC port to be provided. The following process setups (table top) to be provided for performing experiments : • AC Servo Motor with synchro Control transformer and servo pot – 1No. • Magnetic amplifier units – 2 Nos. • Potentiometric error detection cum Magnetic Amplifier – 1No. **b. Accessories:** Required number of patch cords and other necessary accessories to be provided. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
5.1	**Encl-4/5, A-II**	**Work Table for Electrical Control Trainer**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
6	**Encl-4/6, A-II**	**Electrical Trainer**	**a. Electrical Transformer Trainer** with Flat demo panel systems of dimension 950 – 970 (L) x 280 – 320 (W) x 700 – 740 (H) containing 1 Phase 300VA (2Nos.) and 3 Phase 300 VA(1No.) Transformer Trainers. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz Single Phase: Primary: 0 -220 V, Secondary: 200 V Three Phase: Primary: 0 -380V, Secondary: 220 V Features: • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. • Study of Transformer regulation. • Measurement of winding temperature. • Effect of type of load on transformer output waveform. • Study of Three phase transformer connections. The Panel to house the following components: • Input 3 phase DOL Starter panel • AC Primary & Secondary voltmeter panel. • Resistive load panel • Dimmer panel • 1 phase Transformer Panel • 3 phase Transformer Panel • MCB isolator panel **b. Accessories:** Required number of patch cords , suitable wattmeter – 1No and other necessary accessories to be provided.

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			c. Instruction Manual: Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
6.1	**Encl-4/6, A-II**	**Work Table for Electrical Trainer**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
7	**Encl-4/7, A-II**	**3-Phase Induction Motor Speed Control Trainer**	**a. 3-Phase Induction Motor Speed Control Trainer** with powder coated sturdy table top Aluminum flat demo panel system of dimension 940-1000 mm(L) x 280 – 320 mm(W) x 520 – 560 mm(H) containing 0.5 HP squirrel cage induction motor foot mounted on chasis with brake pulley and Hand Held tacho meter. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz <u>Features:</u> • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. The Panel to house the following components:

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			• 1 phase motor, alternator panel • AC voltmeter panel • AC ammeter panel • IGBT controlled AC drive panel **b. Accessories:** Required number of patch cords and other necessary accessories to be provided. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
7.1	**Encl-4/7, A-II**	**Work Table for 3-Phase Induction Motor Speed Control Trainer**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
8	**Encl-4/8, A-II**	**3-Phase Induction Motor Fault Simulator**	**a. 3-Phase Induction Motor Fault Simulator** with powder coated sturdy table top Aluminum flat demo panel system of dimension 900-950 mm(L) x 280 – 320 mm(D) x 450 – 520 mm(H) containing 0.5 HP squirrel cage induction motor foot mounted on chasis with brake pulley and Hand Held tacho meter. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz <u>Features:</u> • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour. • Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • **All machines are mounted on finely painted sturdy base frame with easy machine interchangeability.** • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. The Panel to house the following components: • Input 3 phase DOL starter panel • AC voltmeter panel • AC ammeter panel • Star delta starter panel **b. Accessories:** Required number of patch cords and other necessary accessories to be provided. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
8.1	**Encl-4/8, A-II**	**Work Table for 3-Phase Induction Motor Fault Simulator**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
9	**Encl-4/10, A-II**	**Stepper motor**	**a. Stepper Motor Trainer** of dimension 450-480 mm(W) x 150 – 170 mm(H) x 330 – 360 mm(D) with Stepper motor demonstration panel with computer based digital controller to study the speed, director and operation of Stepper motor, Position control by step and continuous operation. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz <u>Features:</u> • Aesthetically prepared colour printed water resistant poly carbonate overlays with electrical circuit schematic drawn for easy understanding. All test points and tags well printed in colour.

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			• Should have 4 mm sturdy shrouded banana patch cords and shrouded arrangements. • Provision for torque measurement delivered at shaft with better resolution/readability & Speed measurement. Digital display for speed & torque to be provided. • Provision for Speed Torque characteristics and efficiency at various loads. • Should be able to draw all graphs. • Facilitates easy and safe wiring by students. • PC based Digital controller. **b. Accessories:** Required number of patch cords and other necessary accessories to be provided. **c. Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **d. Spare Parts:** Set of spare parts recommended for five years normal operation **List of spare parts to be enclosed.** **NOTE : Following documents are mandatory and are to be submitted along with Technical Bid :** **1. Front & Back Panel drawing for detailed layout of Input / Output terminals, Power switches, Metering with schematics.** **2. Circuit drawings of complete Test Rig.**
9.1	**Encl-4/10, A-II**	**Work Table for Stepper motor**	**Work Table:** Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 - 780 (H) with powder coated suitable to mount above trainer to be supplied. Work table to be comprised of Table Top (18mm thickness) with smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.
10	**Encl-4/137, A-II**	**Test Bench**	**Electrical Test Bench for experiments:** Electrical Test Bench antistatic to enable easy, fast and accurate testing of different Electrical equipment. . Three phase 380 V 50Hz / Single phase, 220 Volt, 50Hz input supply sockets to be provided. **0Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz Consist of 3 partitions as below: 1. Bottom structure: Work Table of dimension approximately 1200 – 1250 mm (L) x 600 – 650 mm (W), 740 – 780 (H) to be comprised of Table Top with antistatic rubber sheet (18mm thickness) and smooth surface finish, MS tubular frame (16 gauge), 3 drawers and castor wheels with locking mechanism so that the table can be easily moved.

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine			
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**
			2. Middle Cabinet structure of dimension 250 -300mm (H) on top of table top to house power sources and MCBs etc. 3. Top Cabinet structure of dimension 250 -300mm (H) to house different electrical equipment. The following components to be housed in the Electrical workbench • Regulated DC power supply: 0 to 25 V minimum • Unregulated DC power supply: 0 to 250 V • Auto transformer: 0 to 415V, Current: 0 to 5A • Single phase multifunction meters: 0 to 220 V, Current: 0 to 5A • Three phase multifunction meters: 0 to 415V, Current: 0 to 5A

Lot-6 - Electronic Trainers:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
1	Encl-4/12, A-II	Oscilloscope - Digital	**Digital Storage Oscilloscope.** 30 MHz Digital Storage Oscilloscope with **Bandwidth:** 30MHz **Channels:** 2 **Rise Time:** <10ns **Equivalent Sampling Rate:** 20 GSa/s **Memory Depth:** 32Kpts **Maximum Input Voltage:** 380V peak **Input Coupling:** AC, DC, GND **Triggering Modes :** Auto/Normal/Single **Triggering Types:** Edge, Pulse Width, Slope, Video, Alternate **Display:** LCD Colour **Power supply :** 220 V +/- 10 % **50Hz** **USB Support**: Yes **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for5 years normal operation**	4
2	Encl-4/15, A-II	Function Generator	**Function Generator Trainer** To study working principle & various faults of Function Generator. The Trainer to allow students to produce the different waveforms and to understand the concept of their generation. • Study of Sinusoidal Waveform Generation. • Study of Triangular Waveform Generation. • Study of Square Waveform Generation. • Study of TTL Waveform Generation. • Fault creation and troubleshooting **Frequency range:** 1Hz to 100 KHz **Waveforms:** Sine, Square, Triangle, TTL **Test Points**: Faults & Test points to be provided **Display:** LCD/LED **Power Supply** : 220V AC ±10%, 50Hz **Input Power Supply available in Palestine:** Single phase 220V,	1

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
			50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	
3	Encl-4/16, A-II	Discrete Component trainer	**Discrete component Trainer** with built-in power supply to study basic semiconductor devices. Connections through Sturdy banana sockets and patch cords. **Components:** Resistors, Capacitors, Inductors, diodes, NPN& PNP Transistors, BJT, FET, MOSFET etc. **Power Supply:** 220 V ±10 %, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	1
4	Encl-4/17, A-II	Linear I.C. Trainer	**Linear I.C. Trainer** with built-in power supply to study different types of Operational amplifiers. Connections through Sturdy banana sockets and patch cords. **Operational Amplifiers:** Comparator, Schmitt Trigger, Inverting, Non inverting, Summer, Difference, Differentiator, Log & Antilog, Low Pass filter, High Pass filter, Band pass & Band Stop filter, Samp & Hold, Timer **Power Supply:** 220 V ±10 %, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning.	1

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
			Set of spare parts recommended for 5 years normal operation	
5	Encl-4/18, A-II	Digital I.C Trainer	**Digital I.C Trainer** with built-in DC power supply of 5V. On board resources such as logic switches/inputs for providing inputs to digital ICs. **Digital Circuits to be covered: M**inimum - Basic logic gates, Universal gates, Flip-flops, Counters, Multiplexers / Demultiplexers, Encoder / Decoder, Full/Half Adder & Substractor. **Connections:** Easy interconnections between circuits **Indicators:** LCD/LED **Power Supply:** 220 V ±10 %, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	1
6	Encl-4/97, A-II	Inverter, sine wave	**Inverter, Sine Wave:** To study about conversion of DC into AC. • To understand the function of Inverter • Different blocks can be explained like charging of battery, DC to AC conversion. • To understand the charging of battery • To study the Inverter circuit • To study the different faults and there troubleshooting in Inverter circuit **Output voltage:** 220 V AC **Battery:** 12V DC **Power:** 1KVA **Main Supply:** 220 V ±10 %, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	2
7	Encl-	Pattern	**Colour Pattern Generator with all accessories:**	1

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
	4/148, A-II	generator with all accessories	**System:** PAL B/G & NTSC **Patterns :** Minimum – Horizontal lines, Cross Hatch with Circle, dot pattern in B/W, Colour Bars, Red Raster & White Raster in Colour **Frequency:** 1 Khz Sine wave **Video carrier:** Lower VHF band : 40-60 MHz Upper VHF band : 170-220 MHz **Power supply :** 220 V +/- 10 % **50Hz** **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation:**	
8	Encl-4/150, A-II	Colour TV Receiver (PAL) with Service Manual	**LCD/LED Television Receiver Trainer** to study working principle of **LCD/LED** Television Receiver. • Study the block diagram and operating principle of LCD/LED TV • Study the functions of controls on Remote • Study the functions of different sections of TV receiver • Study of waveforms/signals of different sections • Study of switch faults and troubleshooting in different sections **Reception**: PAL **Display:** 14'' LCD /LED **List of faults:** 12V supply, 5V supply, Standby voltage, Monitor, USB, Audio/Video, LCD. **Interface:** USB, HDMI **Trigger Modes:** Auto, Normal, Single **On Screen Display to set**: Volume, Brightness, Contrast, Colour, Channel & Band selection, Tuning. Test Points & faults to be provided. **Power supply : 220 V +/- 10 % 50Hz** **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments	1

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
			supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation:**	
9	Encl-4/151, A-II	Colour TV Receiver – Three System with Service Manual	**LCD/LED Television Receiver Trainer** with Three System to study working principle of **LCD/LED** Television Receiver. • Study the block diagram and operating principle of LCD/LED TV • Study the functions of controls on Remote • Study the functions of different sections of TV receiver • Study of waveforms/signals of different sections • Study of switch faults and troubleshooting in different sections **Reception**: PAL, NTSC, SECAM **Display:** 20'' LCD /LED **List of faults:** 12V supply, 5V supply, Standby voltage, Monitor, USB, Audio/Video, LCD. **Interface:** USB, HDMI **Trigger Modes:** Auto, Normal, Single **On Screen Display to set**: Volume, Brightness, Contrast, Colour, Channel & Band selection, Tuning. Test Points & faults to be provided. **Power supply : 220 V +/- 10 % 50Hz** **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation:**	6
10	Encl-4/152, A-II	Trainer Kit-Six in demonstration	**TRAINER KIT – SIX IN DEMONSTRATION** with Built in Radio, Taper Recorder, Audio CD Player, MP3 Player, VCD Player & DVD Player. **VCD Player Trainer** **System:** PAL, NTSC **Laser:** Semiconductor laser **Wave Length:** 780 790 nm **Frequency Range:** 20Hz to 20 kHz, **Modulation:** EFM **Quantization:** 16-Bit/liner/channel **Sampling Frequency:** 44.1 kHz **RF Output:** VHF III Band **Sound System:** External speaker and Headphone **Circuit Block:** On board block diagram. **Panel Control:** Stop, Open/Close, Play/Pause, R/L, +10, 1, 2, 3, 4, and 5.	2

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
			Test Points: more than 30 **Power Supply:** 220V ± 10%, 50Hz **Set of spare parts recommended for 2years normal operation** **DVD TRAINER** The trainer model showing all the sections of DVD separately with block diagrams printed on front panel showing it's output. Each stage ,outputs are brought out to the terminal as a test point to observe it's output and working principles. The output can be connected to 5 in 1 speaker system / home theater and colour TV receiver of 14" (To be supplied along with the equipment) Disk Diameter : 120mm Disk Capacity : 4.7 GB (Single Side Single Layer) Data Transfer Rate : 4.7 Mbps Playback Time : 133 Minutes apprx **Power Supply :** 220 V ±10 %, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5years normal operation**	
11	Encl-4/153, A-II	DTMF Telephone Trainer	**DTMF Telephone Trainer** To study working principle & various faults of DTMF Telephone Trainer • Study of the Working of Dialer Section & of DTMF Signals • Study of the Working of Ringer, Dialer section, Ringer volume control • To Study different faults & troubleshooting • Telephone instruments required for training to be provided. • Test Points to be provided **Dialer :** DTMF **Power Supply**: 220 V ±10%, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments,	2

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
			brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	
12	Encl-4/154, A-II	Micro Processor Training kit	**8085 / 8086 Microprocessor Training Kit** to provide basic information about 8085 and 8086 microprocessor and peripherals **CPU:** 8085 / 8086 Microprocessor **ROM:** Minimum 64Kbytes EPROM with battery backup **Display:** LCD/LED **Keyboard:** Hexadecimal **Interface:** RS232 C **Bus:** All address, data & control lines **Faults:** Pins of Address bus, Data bus **Power Supply:** 220V ± 10%, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	16
13	Encl-4/155, A-II	Digital Counter with all accessories	**Digital Counter with all accessories** to study the fundamental principle and functioning of Digital Counter. **Technical specification**: **Frequency range**: 0 to 1000 Mhz **Time Range:** 10s to 1ns **Frequency display**: LCD/LED **Power supply:** 220 V AC+/- 10% 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	2
14	Encl-	Transistor	**Transistor Tester** to study and test different types of	1

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine				
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**
	2/117, A-II	Tester	Transistors. • Study of NPN & PNP Transistors • Short Circuit and Open Circuit test for NPN and PNP transistors. • Study of characteristics of NPN Transistor in Common Base, Common Emitter & Common Collector Configurations • Study of characteristics of PNP Transistor in Common Base, Common Emitter & Common Collector Configurations **Power Supply :** 220 V ±10 %, 50Hz **Input Power Supply available in Palestine:** Single phase 220V, 50Hz **Instruction Manual:** Should contain Information on features, operation and maintenance. Instructional manual having list of Experiments, brief introduction, circuits, apparatus used, procedure, tabulation etc. Well illustrated documents with clean figure, theoretical explanation to be provided. Log of experiments supported with observator tables for easy learning. **Set of spare parts recommended for 5 years normal operation**	

Enclosure – VII

Lot – 7 - Electrical Panels:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Remarks / Deviations**
1	Encl-4/24, A-II	E.L.C.B	**E.L.C.B (Earth Leakage Circuit Breaker)** Range: 5KVA Trainer Model with all the input output terminals are brought out on the panel for making external connections mounted on a panel Board with screen-printed notations on 6 mm thick insulated Hylum sheet. The equipment to be housed in a wall mounted **Box of Size 2 x 1.5 feet approximately.** **Specifications:** Input auxiliary voltage : 220V, 380V VAC 50Hz Current Sensitivity range : Variable up to 12A. Tripping time : Variable: 0.15-3 sec Core balance : current-transformer type Relay contacts: One pair of potential free NO & NC Contact Rating : 3 Amps / 220VAC / 24 VDC **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	1	
2	Encl-4/25, A-II	R.C.C.B	**R.C.C.B (Relay Current Circuit Breaker),** Range: 5KVA Trainer Model with all the input output terminals are brought out on the panel for making external connections mounted on a panel Board with screen-printed notations on 6mm thick insulated Hylum sheet. The equipment to be housed in a wall mounted **Box of Size 2 x 1.5 feet approximately.** **Specifications:** Input auxiliary voltage : 220V, 380V AC 50Hz Current Sensitivity range : Variable up to 10A Tripping time : Variable: 0 - 30 sec Relay contacts : One pair of potential free NO & NC contact **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	1	
3	Encl-	M.C.C.B	**M.C.C.B (Miniature Current Circuit Breaker)**	1	

	4/26, A-II		Range: 5KVA Trainer Model with all the input output terminals are brought out on the panel for making external connections mounted on a panel Board with screen-printed notations on 6mm thick insulated Hylum sheet. The equipment to be housed in a wall mounted **Box of Size 2 x 1.5 feet approximately..** **Specifications:** Input auxiliary voltage: 220V, 380V VAC 50Hz Current Sensitivity range: Variable up to 20A Tripping time Variable: 0 - 30sec Relay contacts: One pair of potential free NO & NC contact Contact Rating: 3 Amps / 220VAC/24 VDC **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz		
4	Encl-4/123, A-II	Cut Section models of Motors	**Cut section models of Motors:** Quality designed Motor, stand-alone operation. Self-contained and easy to operate. A comprehensive Cut Section of DC Machine designed to explain students, the electrical principle behind their working and describes major Machines parts and students able to see clearly the major component parts of the Machine and how they are interconnected. Input: 200V Fixed DC, 0-200V Variable DC **Machine Specification One each** A. Type: DC Shunt Rated Voltage: 200V Rated Power: 1 HP B. Type: DC Compound Rated Voltage: 200V Rated Power: 1 HP C. Type: Three Phase Alternator Rated Voltage: 200V Rated Capacity: 3 KVA D. Type: Three Phase induction motor Squirrel Cage type Rated voltage: 380 V 3 Phase Rated power: 3 Hp E. Type: Three phase induction motor slip ring Rated Voltage: 380 V 3 Phase Rated Power: 3 HP **Input Power Supply available in Palestine:** 3	1 set	

			Phase 380V, 50Hz / Single phase 220V, 50Hz		
5	Encl-4/134, A-II	Single phase preventer	**SINGLE PHASE PREVENTER** Single phase preventer trainer model for Protection of induction motors against single phasing or reverse phasing or unbalance supply is one of the major problems in electrical systems. Suitable for the protections of motors of any H.P. Individual trip indication for SPP, reverse phasing and indication for output relay ON. Auto reset type voltage hysterisis gap for tripping on under/over voltage. **Technical Specifications:** System Supply: : 380VAC, Three phase +/- 10%, min 2.2 KW Output contact rating: : 5 Amps at 220 V AC. Trip Time delay: : 2-3 seconds. Reset Mode: : Auto reset. Trip Indications: : For SPP, reverse phasing and relay ON indication. The complete test kit is to be housed in a **powder coated metal enclosure of size 2' x 2** rectangular box. The front panel to be made of 6mm thick insulated Hylum sheet which should consist of MCB, ELCB, HRC fuses, indicating lamps and insulated terminals. Voltmeter and Ammeter are to be provided for measuring output voltage and current. The block diagram should be printed on the panel in screen printing. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	1	
6	Encl-4/135, A-II	Earth Leakage Switch	**EARTH LEAKAGE SWITCH:** Trainer model with the following specifications: Auxiliary supply : 220/415V AC, 50Hz Built-in relay contact : 5 amps (resistive) 380V AC or 220 V DC Core balance C.T. : Toroidal core, bar primary Number of contacts : One N/O and One N/C. The complete test kit is to be housed in a powder coated metal enclosure of size 2' x 2' rectangular box. The front panel to be made of 6mm thick insulated Hylum sheet which should consist of MCB, ELCB, HRC fuses, indicating lamps and insulated terminals. Voltmeter and Ammeter are to be provided for measuring output voltage and current. The block diagram should be printed on the panel in screen printing to show it's working.	1	

			Input Power Supply available in Palestine: 3 Phase 380V, 50Hz / Single phase 220V, 50Hz		
7	Encl-4/90, A-II	Contactor	**3 phase, 440 volt, 16 amps 2 NO & 2 NC auxiliary contactor mounted on 2' x 2' (L x B)** size or suitable size powder coated metallic box. The front panel to be made of 6 mm insulated industrial hylum board with terminals brought out on the panel to make external connections and the Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	1	
8	Encl-4/91, A-II	Contactor	**3 phase, 440 volt, 32 amps 2 NO & 2 NC** auxiliary contacts mounted on 2' x 2' (L x B) size or suitable size powder coated metallic box. The front panel to be made of 6 mm insulated industrial hylum board with terminals brought out on the panel to make external connections and the Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	1	
9	Encl-4/94, A-II	Knife switch	**DPDT Knife Switch 16 Amps** fitted on hylum industrial panel insulated board of 6 mm **thickness and mounted on 2' x 2' (L** x B) size or suitable size powder coated metallic box with terminals brought out on the panel with 16 Amps HRC fuse mounted on it to make external connections. Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	4	
10	Encl-4/95, A-II	Knife switch	**TPDT Knife Switch 16 Amps** fitted on hylem industrial panel insulated board of 6 mm **thickness and 2' x 2' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel with 16 Amps HRC fuse mounted on it to make external connections. Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	4	
11	Encl-4/92, A-II	Limit Switch - Set	**Limit switch Quick action** with 2NC + 1NO,2NO+ 1NC, fitted on hylem industrial panel insulated board of 6 mm thickness and **mounted on 2' x 2' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel.	1set	

			Limit switch Delayed action with 2NC + 1NO, 2NO + 1 NC, fitted on hylem industrial panel insulated board of 6 mm thickness and mounted on 2' x 2' (L x B) size or suitable size powder coated metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz		
12	Encl-4/93, A-II	Rotary switch set	**Rotary switch 16 A 500V 3 Pole** fitted on hylem industrial panel insulated board of 6 mm **thickness and 2' x 2' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel with 16 Amps HRC fuse mounted on it to make external connections. Circuit drawing to be screen printed on the panel. **Rotary switch 16 A 500V 4 Pole** fitted on hylem industrial panel insulated board of 6 mm **thickness and 2' x 2' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel with 16 Amps HRC fuse mounted on it to make external connections. Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	2 sets	
13	Encl-4/89, A-II	Relays - set	**Over current, leakage current (Earth leakage) relay** with current injection kit 0-20A with time interval meter fitted on hylem industrial panel insulated board of 6 mm thickness and **mounted on 2' x 2.5' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel.	1	
			Under voltage, Over voltage with voltage injection kit 0-450v with time interval meter fitted on hylum industrial panel insulated board of 6 mm thickness and mounted on 2' x 2.5' (L x B) size or suitable size powder coated metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz	1	
14	Encl-4/110, A-II	Relays - set	**Cut out, reverse current, over load, under voltage relay** fitted on hylem industrial panel insulated board of 6 mm thickness and mounted on 3' x 2' (L x B) size or suitable	1	

			size powder coated metallic box with terminals brought out on the panel to make external connections with external source of voltage 220V & current 2A. Circuit drawing to be screen printed on the panel. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz		
15	Encl-4/111, A-II	Starters for 3 Phase, 380V, 50 cycles, A.C. motors - Set	**Set consisting of following** **Direct on line starter** for 3 Phase 380V 50 Hz 1.5 kw, with No Volt & overload protection fitted on hylem industrial panel insulated board of 6 mm thickness and **mounted on 2' x 2' (L x B) size or suitable size powder** coated metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel. **Star delta starter** for 3 Phase 380V 50 Hz 3.75 KW fitted on hylem industrial panel insulated board of 6 mm thickness and **mounted on 2' x 2.5' (L x B) size or suitable size powder coated** metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel. **Auto transformer starter** for 3 Phase 380V 50Hz 3.75 KW fitted on hylem industrial panel insulated board of 6 mm thickness and mounted on 3' x 2' (L x B) size or suitable size powder coated metallic box with terminals brought out on the panel to make external connections and attached to auto transformer unit. Circuit drawing to be screen printed on the panel. **Rotor Resistance starter** for 3 Phase 380V 50 Hz 2.2 KW fitted on hylem industrial panel insulated board of 6 mm thickness and **mounted on 2' x 2' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel to make external connections and attached to rotor resistance unit. Circuit drawing to be screen printed on the panel. **Soft starter AC drive VFD** (Programmable) for Three phase input and Three phase output 3.75 KW fitted on hylem industrial panel insulated board of 6 mm thickness and mounted on 3' x 2' (L x B) size or suitable size powder coated metallic box with	1 Set	

			terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel. **Forward Reverse starter** for 3 phase 380V 50Hz suitable for 1.5 KW with contactor NC inter lock fitted on hylem industrial panel insulated board of 6 mm **thickness and mounted on 2' x 2' (L x B) size or suitable size** powder coated metallic box with terminals brought out on the panel to make external connections. Circuit drawing to be screen printed on the panel. One 5HP 1440rpm Squirrel cage induction motor and One 3 HP 1500 rpm Slip ring motor foot mounted with star/delta connections to be supplied for conducting experiments & working of all above starters. **Input Power Supply available in Palestine:** 3 Phase 380V, 50Hz / Single phase 220V, 50Hz		
16	Encl-2/111, A-II	Variac	**Variac Demonstration Type (Portable) with meters and controls** INPUT RANGE Normal : 220V, 50Hz Output : 380 V Efficiency : 90% (approx)	1	

Enclosure – VIII

Lot – 8 - Electrical Items:

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
1	Encl-4/27, A-II	M.C.B	One each **MCB** type of a. 2 pole 250V, 16 Amps rated mounted on MCB panel b. 3 pole 500V, 16 Amps rated mounted on MCB panel **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2 Sets	SIEMENS / ISI STANDARD
2	Encl-4/68, A-II	Analog multi Meter	**Analog multi meter** with pair of test leads, carrying case, battery, instruction manual and accessories fuse to measure AC - DC volts & currents, resistance, continuity testing with 9V power and measuring range 0 to 1000 M ohms and testing voltage of 2.5 to 500 volts **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	4	MECO / EIC / ISI STANDARD
3	Encl-4/69, A-II	Digital Multi meter	**Digital multi meter** with pair of test leads, carrying case, battery, instruction manual and spare fuse to measure AC - DC volts and currents, resistance, continuity testing, palm size with built-in tilt stand, 3½ digit – 1999 counts display with 9v battery power **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	8	ISI STANDARD
4	Encl-4/70, A-II	A.C. Voltmeter, MI	Multi Range: 0-250- 500 V AC, MI with anti parallax mirror, Knife edge pointer, portable type **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
5	Encl-4/71, A-II	Milli Voltmeter centre zero	Portable **milli voltmeter with centre zero** 100 – 0 - 100 millivolts, portable type with anti parallax mirror, Knife edge mirror **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
6	Encl-4/72, A-II	D.C Milli ammeter	Portable **milli ammeter** of range: 0 - 500 mA MC, Class-1 portable type with anti parallax mirror, Knife edge mirror **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
7	Encl-4/73, A-II	D.C. Ammeter MC	Portable **Ammeter** of Range: 0 – 1 A,MC, portable type with anti parallax mirror, Knife edge mirror	2	MECO / EIC / ISI STANDARD

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
			Input Power Supply available in Palestine: Single phase 220V, 50Hz		
8	Encl-4/74, A-II	Ammeter MC	Portable, MC, Range: 0-5 A **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
9	Encl-4/75, A-II	Ammeter MC	Portable, MC, Range: 0-15-25 A **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
10	Encl-4/76, A-II	A.C. Ammeter MI	Portable , MI, Range 0-5 A **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
11	Encl-4/77, A-II	A.C. Ammeter MI	Portable, MI, Class-1, Multi Range 0-15-25 A **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
12	Encl-4/78, A-II	K.W. Meter	Portable watt meter dynamo motor type of multi range 0-1-3 KW, 2.5/5A with anti parallax mirror and knife edge pointer. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
13	Encl-4/79, A-II	A.C. Energy Meter	Induction type, Single phase, 220 V, **50Hz**, 5A panel mounting type. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	MECO / EIC / ISI STANDARD
14	Encl-4/80, A-II	Single Phase power factor meter	Portable Digital power factor of 0.5 lag to 0.5 lead, 0-110- 220 Volts, current of 1-5 Amps **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
15	Encl-4/81, A-II	Frequency Meter	Digital **frequency meter** with main frequency range of 30 Hz to 90 Hz & 0.01 resolution, 180 - 220V AC power supply. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
16	Encl-4/83, A-II	Current transformer	20/5 Amps, 10/1 Amps Wound Primary Type or Bar Primary Type **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	
17	Encl-4/84, A-II	Potential Transformer	One Set consisting of 1000/500V & 500/200V Potential Transformers **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2 Sets	ISI STANDARD

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
18	Encl-4/86, A-II	Tong tester/ Clamp meter	0 - 5 -10 Amps, provision to measure voltage of 0 - 250 - 500 volts digital type **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
19	Encl-4/87, A-II	Megger set	One each Generator type **Megger set** of range 500 Volts & 1000Volts **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2 sets	ISI STANDARD
20	Encl-4/88, A-II	Wheat stone bridge	**Wheat Stone Bridge Provided with DC power supply and Galvanometer** **Technical Specifications:** **DC Power Supply** : 5V **Resistance** : 80 Ohm **Type** : Variable **Range** : 0 – 10 KOhm **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
21	Encl-4/96, A-II	DC power supply	**DC power supply** Good Regulation and Low Ripple **Technical Specification:** Output: **0-100V, 5A.** **Protection:** Short and Over load **Indication:** Digital Meter for Voltage and Current Indication. **Power Supply:** 220 V ±10 %, **50Hz** **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	3	
22	Encl-4/98, A-II	Servo Voltage Stabilizer	**SERVO VOLTAGE STABILIZER** Demonstration model showing the working principle of Servo stabilizer with Servo motor and voltage corrector **Specifications;** **Input Voltage Range:** 150V to 220 V AC., Single-phase **Output Voltage:** 220VAC. Nominal, Internally Settable to 220V to 240V. **Output Voltage Indication:** By Digital Voltmeter Electronic under/over voltage Protection **Upper Limit:** 220V AC **Lower Limit:** 150V AC **Over Load Indication:** By LED **Rating:** 1 KVA. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	
23	Encl-4/108, A-II	Flux meter	**Digital flux meter** : To measure DC Magnetic fields, voltage integration, ferro magnetic detectors, EMF Tester. **Specification:**	2	ISI STANDARD

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
			Input Power : 220 V, 50Hz, 25VA. Input Resistance : 10 Kilo Ohms Output Resistance : 1 Kilo Ohms Output Voltage: 1 Kilomaxwell turns Display: LED/LCD **Input Power Supply available in Palestine: Single phase 220V, 50Hz**		
24	Encl-4/109, A-II	Lux meter	**Portable Lux meter** with LCD/LED display, 0-50000 Lux range, 1Lux resolution. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	ISI STANDARD
25	Encl-4/128, A-II	Auto transformer	**Auto transformer** three phase 3.5 Kw 415V **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	
26	Encl-4/138, A-II	Clamp on Ammeter	Digital **Clamp meter** with accessories like test leads, carrying case, manual. etc. with 3 1/2 digits 2000 counts display to measure AC current up to 600A, AC Voltage, DC voltage, resistance, diode test. etc **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	3	MECO / EIC / ISI STANDARD
27	Encl-4/142, A-II	Earth Resistance Tester	**DIGITAL EARTH RESISTANCE TESTER** **Earth Resistance:** 0-2000 Ω **Earth Voltage**: 0-200V **Display:** Digital display **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	
28	Encl-4/147, A-II	Stabilized low voltage power supply	**DC Regulated Power Supply Dual Output** -50v to +50v regulated adjustable DC output with voltmeter & Ammeter, 3v, 6v , 12v separate AC outputs 1. Output Adjustable from 0 to -50V DC, 3A 2. Output Adjustable from 0 to +50V DC, 5A 3. AC output for (i) 3V @3A (ii) 6V @3A (iii) 12V @3A **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	
29	Encl-4/149, A-II	High Voltage Probe with meter	High Voltage Probe with meter used to measure high voltages in TV sets, power supplies, laboratories and for general high voltage commercial applications. **Maximum Measuring Voltage:** 35kV / 40kV **Type:** Digital	4	

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
			Input Power Supply available in Palestine: Single phase 220V, 50Hz		
30	Encl-4/157, A-II	Mini drill machine for P.C.B's	A compact tabletop High speed Mini drill machine for P.C.B's with complete accessories and with power supply. **Features:** • Rugged and sturdy construction • Longer operational life • Optimum performance • Minimum power consumption **Drilling Size:** 0.5-3 mm **Table size:** Minimum 220x120 mm **Bed Type:** Regular PCB Drilling Bed **Operating Voltage:** 12V DC **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	
31	Encl-4/163, A-II	Degaussing coil	Degaussing coil to demagnetize the picture tube of the colour TV receiver. **Type:** Circular **Coil diameter:** 300 mm **Operating voltage:** 220 V ±10 %, **50Hz** **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	2	
32	Encl-4/165, A-II	Motor Winding Set	Armature winding of FHP AC motor set for motor winding practice. The set should contain the following: • Shaft • Insulating paper • Bearings with assembly manual • Rotor • Copper coil • Body **Input Power Supply available in Palestine: Single phase 220V, 50Hz & Three Phase 380V, 50Hz**	1	

Project: Supply of TVET equipment and providing Technical Services to Vocational Training Centre in Yatta, Palestine					
Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
			Armature winding of FHP DC motor set for motor winding practice. The set should contain the following: • Brush holder • Shaft • Insulating paper • Commutator • Bearings with assembly manual • Carbon brush • Rotor • Copper coil • Body **Input Power Supply available in Palestine: Single phase 220V, 50Hz & Three Phase 380V, 50Hz**	1	
33	Encl-4/168, A-II	Electronic Flasher	Electronic flasher units are load sensitive, whereby if a bulb failure occurs the flasher rate increases to indicate the failure. Suitable for flasher & hazard light application. **Operating Voltage:** 9 - 16 volts D.C **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	
34	Encl-2/108, A-II	Ammeter AC/DC	Ammeter AC Digital portable precision grade teak wood case leather belt type, 0-5 A range. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	5	MECO / EIC / ISI STANDARD
			Ammeter DC Digital portable precision grade teak wood case leather belt type, 0-5 A range. **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	5	
35	Encl-2/110, A-II	Megger	Electronic Type Megger 1000 Volt with Digital Display **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	ISI STANDARD
36	Encl-2/112, A-II	Wattmeter multi range up to 1KW	Digital Wattmeter of range 0-1KW with floating decimal point, max current 5Amp with 4 digits, 7 segments, bright LED/LCD display of 150 to 300 volts AC, 50Hz **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	ISI STANDARD
37	Encl-2/113, A-II	Wattmeter multi range up to 5KW	Digital Wattmeter of range 0-5KW with floating decimal point, max current 5Amp with 4 digits, 7 segments, bright LED/LCD display of 150 to 300 volts AC, 50Hz **Input Power Supply available in Palestine: Single**	1	ISI STANDARD

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Sl. No	**Annex Ref.**	**ITEM**	**Brief Specification**	**Qty**	**Make**
			phase 220V, 50Hz		
38	Encl-2/118, A-II	RLC Bridge	**RLC Bridge Meter :** Test Frequencies: 100Hz to 100kHz Measurement Accuracy: 0.1% Display: LCD/LED **Input Power Supply available in Palestine: Single phase 220V, 50Hz**	1	ISI STANDARD

End of Section - V