GOVERNMENT POLYTECHNIC MAYURBAHNJ,

AT:- Tikarpada, PO:-Poda Astia,Via-Shyamakhunta,

Dist: - Mayurbhanj, PIN-757049, Odisha.

(ESTD-2015)

Government of Odisha.

Bid Document.

Tender call Notice No- 94 , Dt. 10.02.2021

PROCUREMENT OF LABORATORY EQUIPMENT, LIBRARY BOOKS & LABORATORY CHARTS FOR
GOVERNMENT POLYTECHNIC MAYURBAHNJ, TIKARPADA.

Phone: 8280500104 (O)

IMPORTANT DATES

Receiving of sealed Tenders-dt.15.02.2021 to dt.15.03.2021(During 10.00 A.M. to 5.00 P.M.)

Opening of sealed Tenders-dt.16.03.2021(11.00 A.M.)

ADDRESS FOR CORRESPONDENCE

Principal, Government Polytechnic Mayurbhanj,
AT: - Tikarpada, PO:-Poda Astia, Via- Shyamakhunta,
Dist: - Mayurbhanj (ODISHA), Pin: - 757049
Phone: 8280500104 (O)
E-mail id: - principalgpmayurbhanj@gmail.com
Website: - www.gpmayurbhanj.org.in

GENERAL INFORMATION, TERMS AND CONDITIONS FOR BIDDER.

01- The Principal, Government Polytechnic Mayurbhanj, Tikarpada invites sealed bids for supply of Laboratories' Equipment, Library Books & Laboratories' charts for different Departments of the Institute. The package-wise lists along with detailed specification & required quantities are enclosed herewith separately vide Package-I, Package -II, Package -III, Package -IV, Package -V, Package -VI, Package –VII & Package-VIII.

02- Bidder can download the tender Documents from our Official website www.gpmayurbhanj.org.in & submit their complete documents for any or all packages in the Office of the Principal, Government Polytechnic, Mayurbhanj along with cost of Bid Documents i.e. Rs 1000.00 (Rupees One Thousand only) in shape of Demand Draft favouring "Principal, Government Polytechnic Mayurbhanj, Tikarpada" payable at any Nationalized Bank located at Baripada. Submission of Tender without Bid documents' cost will not be taken in to consideration. No Bid document is being sold from this Office directly.

03**-** Bidder is required to indicate the page no. of each of the documents of the Bid. He is also required to furnish Make, model, Brand supported with literature, leaflet & Diagram, if any, of the Equipment as per the package-wise list.

04- Bidder is also required to deposit E.M.D. (Earnest Money Deposit) or Bid Security @ 1% of the bid value for each Package of equipment quoted by him (Package-I to Package-VI only).No EMD or Bid Security for Library Books & Laboratory Charts (Package-VII & Package-VIII only) is required to be deposited by a Bidder.

The EMD must be in shape of Demand Draft only drawn in favour of "Principal, Government Polytechnic Mayurbhanj, Tikarpada" Payable at any Nationalized Bank located at Baripada. Submission of Bid without EMD shall summarily be rejected. Further, Bid with part-EMD is also liable for rejection. EMD will be returned to unsuccessful bidders on finalization of Purchase order. EMD of the successful bidder will be discharged upon his signing a contract and furnishing the performance security.

EMD will be forfeited if; (I) A Bidder withdraws his bid during the period of bid validity or, (ii) if Bidder fails to furnish the performance security as per clause- 13.

05-FOR LIBRARY BOOKS & LABORATORIES' CHARTS:-

(I)Cost of Bid Documents @ Rs.1000.00 (Rupees One Thousand only) (For each or both Package-VII & Package-VIII).

(II)All Books & Charts must be of recent edition.

(III)All Laboratories' charts must be of wall-hanging with flex printed & laminated.

(IV Bidder is required to clearly specify the maximum discount on the Books & Charts separately.

(V)There is no EMD towards bidding of Books & Charts.

06- Bidder is required to submit his bid in the following manner:

(a)One sealed envelope containing Technical Bid and EMD for each package

(b)One Sealed envelope containing Financial Bid for each package

(c)One unsealed common envelope(instead of package-wise) containing the commercial documents like GST Registration Certificate, GST return (latest), PAN & IT return (latest) ,as required, along with the Bid Documents' price(i.e. Rs.1000.00 only) in shape of Bank Draft.

All the above envelopes must be super scribed as "Technical Bid for package-," "Financial Bid for package-" and "Common documents", as the case may be.

In Case of Library Books & Laboratories' charts, Bidder has to submit 02(Two) envelops only & out of which 01(One) envelope (Sealed) for Financial Bid (for package-VII & VII) & another (Unsealed) containing the common commercial documents like GST Registration Certificate, GST return (latest), PAN & IT return (latest), as required, along with the Bid Documents' price (i.e. Rs.1000.00 only) in shape of Bank Draft.

Accordingly, all the sealed packets should be kept in one outer envelope super scribing the followings:
Tender Notice No_94_/dt. 10.02.2021
i) Tender for Supply of Laboratory Equipment/Technical Books/ Laboratories Charts.
ii) Package(s)-
iii) Date of submission of the Tender……..
iv) Name of the firm with detail address……

07- Conditional tender shall be out rightly rejected.

08- Tenders are required to be submitted in the office of the Principal, Government Polytechnic Mayurbhanj, Tikarpada through **Speed post/Registered post/by Courier/by hand on all working days during 10.00 A.M. to 5.00 P.M. from dt.15.02.2021 to dt.15.03.2021 & which will be opened at 11.00 A.M. on dt.16.03.2021 in the office chamber of the Principal, Government Polytechnic, Mayurbhanj, Tikarpada**. Interested Bidders or their Authorized representatives may remain present during opening of the sealed tenders as per the schedule**.** Tenders received after due date and time are not to be considered. Further, the authority shall not be held responsible for delay or missing of the tender documents during postal transit. Tender by E-mail/Fax shall not be entertained. If the office happens to be closed on the date of receipt and opening of the tenders specified, tenders will be received & opened on the next working day at the same time and venue.

09- (I) Price quoted should be inclusive of all required accessories on FOR Destination basis.
(II Bidder shall have to give the price break up indicating basic price, tax etc. as per the price schedule format (Item-wise) in **Annexure-I**. Rate shall be indicated both in words and figure. In case of discrepancy, rate quoted in words in tender shall be taken in to consideration.

10- No Claim shall be entertained towards any expenses incurred by a Bidder for submission of his tender.

11- A Bidder is required to furnish Certificate & proof of supplying such or similar type equipment to reputed Institutes like NITs/IITs/Govt. Institutes /Research Organizations as performance report.

12- BID EVALUATION: - The Purchaser will evaluate and compare the Technical bids in first instance then go for the financial bids determined to be substantially responsive i.e. which:
(a) Are properly signed, and
(b) Confirm to the terms and conditions and specifications
GST, in connection with sale of goods shall not be taken in to account in evaluation. Quality, Price, Brand & Suitability of equipment with regards to practical training in the laboratories shall be the primary factor for selection. The Bid shall also be evaluated taking in to consideration of **after-sale-service** provided by the firm, experience in supplying of such or similar type of equipment & Books to reputed organizations/Institutions. The Technical Committee is empowered to select any of the Quoted items taking in to account Quality, Brand & Price, which may not always be the lowest quoted price.

13- PERFORMANCE SECURITY: -

I) Supplier shall submit a performance security Guarantee to the purchaser of an amount of 10% of the contract value after completion of supply and before release of his payment as enclosed at **Annexure-II**.

ii) Validity of the performance security guarantee should cover the guarantee/warranty period, i.e. 24(Twenty Four) months from the date of supply/inspection/installation, as the case may be.

iii) No Payment shall be released to supplier against his bill without submission of the performance Security guarantee.

iv) The performance security shall be payable to the purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the contract.

(v) The performance security will be denominated in Indian Rupees only in the following forms:

(a)A Bank Guarantee issued by a Nationalized Bank located in India in the form provided in bidding documents acceptable to the purchaser.

or

(b) Demand Draft drawn in favor of Principal, Government Polytechnic Mayurbhanj, Tikarpada Payable at any Nationalized Bank located at Baripada.

The Performance security guarantee will be released to supplier by the purchaser not later than 30 (Thirty) days following the date of completion of its validity.

14- PERFORMANCE STATEMENT – Bidder shall submit his experience in supplying of similar equipment at least for last 3(three) years in performance statement format at **Annexure-III.**

15- DELIVERY OF GOODS-Equipment shall be delivered at Government Polytechnic, Mayurbhanj, Tikarpada within 90 (Ninety) days from the date of issue of purchase order along with Supplier's Delivery Challan (in Triplicate). Any delivery beyond the stipulated period will not be allowed and the Purchase Order will stand cancelled.

16- PAYMENT TERMS: - 100% payment shall be made within 15(Fifteen) days after satisfactory inspection/ verification/ installation of Equipment. The supplier is required to furnish his Tax Invoice (in Triplicate) showing goods' description, quantity, unit price, tax, total amount addressed to the Principal, Government Polytechnic Mayurbhanj, Tikarpada.

17- BID VALIDITY: - Price quoted in bid shall be valid for 90(Ninety) days from the date of opening of tender.

18- WARRANTY/GUARRANTY: - The equipment shall be covered with warranty/guarantee for a minimum period of 24(Twenty Four) months from the date of inspection/verification/installation. The firm shall provide prompt after –sale-services and attend complaint within a week to prevent disruption of training program in the Institute. **A Supplier has to give 02(Two) free after-sale-services of his supplied equipment within the warranty /guarantee period, wherever applicable.**

19-**TAXES AND DUTIES**: Bidder shall be entirely responsible for all Taxes, License fees, Road permits etc. incurred until delivery of the materials. He/ She has to provide Valid GST registration certificate, photo copies of GST return (Valid), Income Tax clearance certificate for 2019-20 and PAN Card along with the Bidding Documents, failing of which the Bid shall summarily be rejected.

20-AUTHORIZATION: In case of the Authorized supplier of an Original Equipment's Manufacturer (O.E.M.), the bid must be accompanied by **Authorization Certificate** from the O.E.M. as per **Annexure-IV**.

21-ACCEPTANCE: Bidder should sign each page of Bid document with seal as a token of acceptance of all terms and conditions of the Tender.

22- PURCHASER'S RIGHT: The Purchaser is having the right to accept/reject any or all bids without assigning any reason thereof.

23- AWARD OF CONTRACT: Purchase order shall be placed with the successful bidder(s). As a token of acceptance, Supplier shall return one copy of the order, duly signed by him on each page, out of the two copies sent to him, within a week.

24- CORRUPT PRACTICE: No bidder shall contact the purchaser on any matter relating to bid from opening time of bid till the contract is awarded. Any effort by the bidder or his agent to influence the purchaser may result in rejection of his bid and forfeiture of bid security.

25- BID LANGUAGE AND CURRENCIES: All Information in the offer including all correspondences & documents & printed literatures furnished by the bidder should be in English. The quoted price will be in Indian Rupees only.

26- RESOLUTION OF DISPUTES BY ARBITRATION: The Purchaser and the supplier should try to resolve the disputes, if any, arising out of the contract amicably between themselves, failing which the same shall be arbitrated in the competent Court located at Baripada, Dist. - Mayurbhanj(ODISHA).

27- BIDDER'S RESPONSIBILITY: (i) Bidder is expected to examine all instructions, forms, terms & conditions as well as specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at the Bidder's risk and may result in rejection of his bid.
(ii) Bidder is required to furnish a checklist along with his bid in the given format at **Annexure-V**.

Sd/-
Principal,
Government Polytechnic Mayurbahnj,
Tikarpada, PIN-757049.

PACKAGE- I

LIST OF EQUIPMENT FOR "FOUNDRY ENGINEERING LABORATORY".

DEPARTMENT- "METALLURGICAL ENGINEERING".

Sl. No.	Name of Equipment	Detailed specification.	Quantity.
01	02	03	04
01	SAND MULLER (To be used to prepare a small batch of green moulding sand for lab testing)	Capacity: 5kg(batch type) Motor with gearbox 0.5 Hp, single phase Water Sprinkling System Accessories: scraper, 2 rollers, two ploughs	1
02	SAND RAMMER To be used for preparing a standard sand specimen. (Dia 50mm (2") Height 50mm(2"))	Accessories: **Base Block**: Function: To isolate the rammer from vibration variation to assure consistent and accurate reading. Dimensions and Weight: Length:350mm,Width:255mm,Height:100mm **Compatibility Tester**: Function: Used to find out compactibility of moulding sand(with compactibility scale and knife) Lenth:150mm,Width:75mm,Height:75mm & **Split Specimen Tube:** Function: To prepare standard samples to carry out strength of moulding sand Length:175mm,Width:100mm,Height:125mm **Tube Filler:** Function: Assist in filling the specimen tube for the compactibility test Dimension and Weights: Length: 220mm,Width: 175mm,Height: 300mm	1
03	**CORE HARDNESS TESTER** (To be used to determine accurately the surface hardness of cores)	The Surface of the core is subjected to controlled abrasion by a four point penetrator and the depth of penetration measured on a horizontally dial gauge.It consist of a probe of penetrator which can be rotated by means of an external knurled ring indexed so that the number of rotations can be counted and a horizontally mounted dial gauge which measures the depth of penetration of the probe.	1

01	02	03	04
04	**RAPID MOISTURE TELLER** (To be used for measuring the moisture content in green moulding sand)	**Capacity**: 10% Moisture(at least) With single pan balance(with Absorbent Compound and carrying case)	1
05	**RAPID SAND WASHER/ CLAY CONTENT TESTER**(To be used to separate the clay particles from sand grains of a given sand sample by means of rapid agitation)	**Specifications**: Electronic control unit(to set washing time and number of cycles , to operate solenoid valves for water inlet-outlet and water level control) Motor: 1/20 hp single phase, Glass jar, Siphon & Wash bottle. Sieve :53 micron Dia:100mm	1
06	**MOULD HARDNESS TESTER (B SCALE)-**(Function: To be used for measuring the surface hardness of green sand moulds and green cores (most useful for checking the degree of uniformity of ramming of mould)	Specification: The tester has a dial gauge calibrated in thousandths of an inch, which is operated by a spring loaded probe of ½" radius. The dial bezel can be rotated and the pointer held in any position by pressing the locking button .The instrument can be carried in the pocket and is most useful for checking the degree or uniformity of ramming of a mould.	1
07	**UNIVERSAL TESTING MACHINE FOR GREEN MOULDING SAND**	**The UTM must develop at least -**(i)50Kg/cm^2 compressive stress(ii)12 Kg/cm^2 shear stress (iii)600Kg/cm^2 transverse stress **specifications**: (i)motorized loading mechanism (ii)Load cell(iii)Digital strength indicator (iv)Compression pads with computer interface (with memory)**.Attachments: Transverse strength attachment** : Length:20mm,Width :50mm, Height :125mm & Weight:0.6 Kg. **Shear strength attachment** : Length:100mm,Width:75mm, Height: 75mm & Weight: 0.7kg. **High dry attachment**: Length: 460mm, Width: 300mm, Height: 250mm &Weight: 0.7 kg.	1
08	**PERMEABILITY TESTER** (To be used to determine the permeability number of green sand ,core sand and raw sand)	**Parts**: air tank ,Manometer unit, permeability chart, two orifices ,rubber seal and siphon **Specifications**: Large Orifice: 36-2450 (permeability number) For small orifice : 1.1-2450(permeability number)	1
09	**MOULDING BOX**	Split type(cope and drag) with guide pins Dimension: 24" x 24 " x7 " Material : cast iron/ Mild steel (Min. 5mm wall thickness)	4

01	02	03	04
10	**SET OF FOUNDRY TOOL KIT**	1.Steel Rammer Round Shape 2.Steel Rammer square shape 3.C.I Peen Hammer 4.Wooden Hand Rammer 5.Wooden Floor Rammer 6.Wooden Peen Rammer 7.Trowel Rectangular Shape 8.Trowel Long Shape 9.Trowel Heart Shape 10.Bent Wire (Steel Wire) with handle 11.Strike off Bar 12.Yankee Lifter 13.Lifter or Cleaner 14.Heart and Spoon Slick 15.Draw spike sharp Edge 16.Draw spike Threaded 17.Sprue Cutter 18.Wooden Mallet 19.Gate Cutter 20.Smoother and Corner Slick Set 21.Runner and Riser Pin Set 22.Aluminium Smoother 23.Swab 24.Vent Wire 25.Hand Bellow	4
11	**THERMOCOUPLE**	Suitable for both reducing and oxidizing atmosphere Temperature range : -200^0C - 1300^0C	03
12	**CRUCIBLE FOR MELTING OF METALS**	Graphite Crucible(5 kg capacity) High Alumina Crucible (5 Kg capacity) Fireclay Crucible (5 Kg capacity) Stainless Steel Crucible (5 Kg capacity) Graphite Crucible (100ml,200ml)- 4 each	4
13	**RADIATION PYROMETER**	Optical Sensor Radiation Pyrometer Small Target to 0.0005" (0.0127mm) Accuracy: ± 0.5% Range Selectable Digital Display: °C,°F,°R,°K Standard Temperature Ranges: (700°C - 3200°C) Extended Temperature Range: (700°C - 4500°C	**01**

PACKAGE- II

LIST OF EQUIPMENT FOR "FUEL TESTING & ANALYSIS AND HEAT TREATMENT LABORATORY"

DEPARTMENT- "METALLURGICAL ENGINEERING".

Sl. No.	Name of Equipment	Detailed specification.	Quantity.
01	02	03	04
01	**PENSKY MARTEN'S APPARATUS**	Flash point range : 50° C - 360° C Oil cup material : brass (fitted with a thermally insulated lifting handle) The cup is fitted with insulated Handle and locking arrangement near Cup flange Assembly rests in Air Bath covered with Dome shape metal top Manually operated stirrer with flexible shaft. Round shaped electric heater with separate temperature regulator(Suitable for operation on 220 volts, 50 Hz, AC mains)	2
02	**ELCTRIC BUNSEN BURNER**	Maximum temperature 800^0c Material: S.S Weight(appx): 0.5kg	4
03	**HOT PLATE**	(330 W x 380 L x 145 D (13 x 14.9x 5.7)	2
04	**PLATINUM CRUCIBLE**	Volume : 50 ml Max Temperature: 1000^0c	2
05	**PLATINUM ELECTRODE**		2
06	**SILLICA CRUCIBLE WITH LID**	50 ml. capacity	10
07	**COLORIMETER**	Wavelength range : 400-710 nm 8 in-built gelatin filters: 430,470,490,520,540,580,600 and 710nm Measurement range : 0-100%T, 0-1.50Abs, 0.1 to 1000 Concentration Resolution: 1%T, 0.01Abs, 0.1 to 1 Concentration Bandwidth : typically 40 nm Light source: Tungsten filament lamp Output: Analogue 10mv per digit Power : 230V , 50 Hz	01
08	**ELECTROANALYZER**	Input: 230V AC , 50 Hz Output: 0-12 V DC with 0.1 V least count. Stirrer arrangement with DC supply	01
09	**ELECTRONIC BALANCE**	Least count: 0.001 gm.LED display. Maximum measurable weight: 1kg	02
10	**PH METER**	As per standard specification	01
11	**SLIDE CALIPERS**	Least count : 0.01mm	02
12	**DESSICATOR**	As per standard specification	02

PACKAGE- III

LIST OF EQUIPMENT FOR "MATERIAL TESTING LABORATORY"

DEPARTMENT- "METALLURGICAL ENGINEERING".

Sl. No.	Name of Equipment	Detailed specification.	Quantity.
01	02	03	04
01.	**SERVO COMPUTERIZED - UNIVERSAL TESTING MACHINES,1200 KN CAPACITY (with Load & Strain rate controls, with front open crossheads and hydraulic grips)**	Capacity- 1200 kN (120 Tons) Servo controlled i.e. with Load rate and Strain rate controls. The machine to be electronically controlled with pressure and flow control valves along with their dedicated controller and they should be controlled in closed loop with PID looping. The machine to be designed with Front end opening crosshead and hydraulic gripping. The design should be suitable for easy fixing of flat or round samples, testing of round & TMT bars up to dia. 42 mm with less jerks during breaking of samples. Accuracy of ± 0.5% of indicated load valve is from 2% to 100% of machine capacity. Accessories: (i) bend attachment, (ii) attachment for compression test, (iii) wire rope testing attachment,(iv) electronic extensometer.vi) NABL Certification.	**1**
02.	**STANDARD - ROCKWELL HARDNESS TESTING MACHINES (ANALOG)**	This machine to be designed for measuring hardness of metals & alloys of all kinds (hard or soft, whether round, flat or irregular in shapes. This machine must be suitable for laboratories, tool rooms, Heat treatment shops, R&D departments, inspection departments, Foundries & educational institutions. Automatic weight selection with automatic zero setting dial gauge. Rockwell test minor load is 10 kgf & major loads are 60,100,150 kgf. Rockwell hardness scales such as HR_A, HR_B, HR_C, etc to be obtained by using different types of inventors (Diamond/Ball). Test height x Throat: 215 x 132 mm. Extra test height & throat of 295 x 148 mm Accessories: standard test blocks for calibrations.	**1**
03.	**FATIGUE TESTING MACHINES**	The machine has to be light, compact & simple in design to be used to test the fatigue strength of materials & to draw S-N diagram, used for laboratories. Machine to be a table model (no need of civil foundation).Rotating beam type machine in which load to be applied in reversed bending fashion. Standard 8 mm diameter specimen to be held in special holders at its ends & loaded such that it experiences a uniform bending moment. The specimen to be rotated at 4200 rpm by a motor (A complete cycle of reversed stresses in all fibres of the specimen is produced during each revolution).The bending moment to be applied with a lever system and can be easily changed by moving a weight over the lever. Maximum bending moment: 200 kgcm to apply (adjustable from 25 to 200 kgcm).Total number of revolutions at which the specimen fails to be recorded by a digital counter (The total number of digits of digital counter has to be at least eight). An interlocking system must put off the motor immediately after specimen fails. Accuracy of applied bending moment ± 1%.	**1**

01	02	03	04
04.	**PENDULUM IMPACT TESTING MACHINES**	Suitable for Charpy & Izod Impact Tests on various materials. Rigid designs of machine frame & other parts(minimum energy absorption during fracture which results in improved test accuracies).The highly stressed & wearing parts like support blocks & strikers must be of special alloy steels duly heat treated. Direct indication of Impact energy absorbed by specimen on large dial. Safety guard for the operator must be provided. Initial potential energy for Charpy : 300 Joules. Initial potential energy for Izod: 170 Joules. L.C. :2 Joules .Pendulum drop angle for Charpy :140° Pendulum drop angle Izod: 90°.	**1**
05.	**PORTABLE ROCKWELL HARDNESS TESTERS**	This hardness tester to be very light in weight (must be able to test parts where bench type hardness tester model is not useful). Hardness tester has to be quite handy for product testing of crank shafts, cylinder blocks, liner & assemblies.(Can also be used for testing the hardness of both inside & outside of surface testing of pipes, bushings, ball bearing rings or other complicated parts.)It must be capable of being used in any direction without affecting the accuracy. Maximum Test height x Throat: 110 x 55 mm. Rockwell hardness scales such as HR_A, HR_B, HR_C, etc to be obtained by using different types of indenters (Diamond / Ball).	**1**
06.	**ERICHSEN CUPPING TESTING MACHINES**	This machine must be designed to reveal the cupping qualities of metal sheets & strips and also to test the adhesion, elasticity & porosity of coats of paints or varnish by way of comparison. Testing sample length and width: 70 x 90 mm. Resolution: 0.1mm. This machine to be used to test maximum thickness of sample up to 2mm.	**1**
07.	**VICKERS CUM BRINELL HARDNESS TESTING MACHINES (Analog TYPE)**	Suitable for finding out Vickers / Brinell hardness of metals from soft to very hard (Push button control for load selection).A range of test loads for Vickers / Brinell - from 1 kg to 250 kg.Optical Magnifications - 35X, 70X & 140X .A precision Diamond Indentor (136° Pyramid) must be used to make sharp indentations on the specimens / samples. Maximum Test height x Throat: 250 x 150 mm. Load accuracy well within ± 1% of nominal load value.	**1**
08.	**MOHS SCALE**	The Collection must contains 9 Minerals represents the scale of Hardness Talc (H=1), Gypsum (H=2), Calcite (H=3), Fluorite (H=4), Apatite (H=5), Orthoclase (H=6), Quartz (H=7), Topaz (H=8) & Corundum (H=9) Accessories & Tools: Knife, Iron Plate, Streak Plate, Glass Plate, Copper Plate, Iron Plate, Garnet Board, Magnet, Hand Lens, Acid Drop Bottle (Empty) & Instruction Manual for Doing These Test.	4

09.	**ULTRASONIC FLAW DETECTOR**	Transmitter Pulse Square Wave Pulses: Transmitter Pulse Voltage: 25 ~ 250V, continuously adjustable with25V increments. Pulse Width: Continuously adjustable from 50 to 800ns with 5ns increments .Under 400Ω/200V, double edge <10ns, automatic optimization for pulse excitation under high frequency Test Mode : Pulse echo and dual transmission Damping: 400, 80 Ohm .Operating Frequency: Optional Broad or Narrow band selections .Broadband: 0.5 ~ 20MHz. Narrowband: 1.5 ~ 3MHz .Gain: 0.0~ 110.0dB. Steps as 0.1, 1.0, 2.0, 6.0 dB, 0.1 dB for intelligent adjustment function. Material Velocity: 1000 ~ 15000m/s continuously adjustable. Set-in 30 common material velocities selectable. Test Range: 0.0~10000mm longitudinal wave at steel velocity. Range continuously variable with minimum 0.1mm increments. Rectification: Positive half wave, negative half wave, full wave. Alarm: Real-time alarm signal, positive and negative thresholds, DAC alarm Optional, alarm audible. Display: 4.3" industrial-levelled TFT colour LCD with 800×480 resolution .Pulse Shift: -7.5 ~ 3000µs.Probe Zero: 0 ~ 999.9µs Pulse Repetition Frequency (PRF): 25 ~ 800Hz, auto adjustment mode Vertical Linearity Accuracy: ≤3% .Horizontal Linearity Accuracy: ≤0.2% .Surplus Sensitivity: ≥60dB (200Φ2 flat bottom hole) Resolution: ≥36dB .Dynamic Range: ≥32dB Reject (suppression): 0 ~ 90% .Electric Noise Level: < 10% Interface: Q9 transducer interface; USB HOST Power Supply: Large-capacity lithium battery without memory effect; Battery Life: More than 8 hours; Built-in charger (optional external charger), AC Mains 220V. Standards: EN12668-1 compliance Conform to JB/T 10061-1999 standard Protection Grade: IP54, NEMA3 Environmental Temperature: -30 ~ 50°C (-22 to 122°F) Relative Humidity: 20% ~ 95%RH. Weight: 0.9Kg, 2 lbs (with battery and built-in charger). Dimensions (L ×W×H): Upper part: 215mm ×126mm×53mm (8.5 x 5.0 x 2.0”) Lower part: 215mm ×104mm×42mm (8.5 x 4.0 x1.65”).	**1**
10	**POLDI HARDNESS TESTER(Rebound hardness tester)**	MATERIAL: Hardened steel ball Dia: 10mm. Standard testy bar individually calibrated Measuring range: 10mm. Scale graduation: 0.1mm Magnification: 10X accuracy of measuring 0.05mm Hardness table: compression table for finding hardness separate table for steel, cast iron, brass, copper and aluminium.	1
11	**MAGNETIC FLAW DETECTOR**	Wet system particle range in size from less than 0.5 micrometres to 10 micrometres Suspension Fluid: Clear highly refined light petroleum oil or water	01

PACKAGE- IV

LIST OF EQUIPMENT FOR "METALLOGRAPHIC LABORATORY".

DEPARTMENT- "METALLURGICAL ENGINEERING".

Sl. No.	Name of Equipment	Detailed specification.	Quantity.
01	02	03	04
01.	**DOUBLE DISC GRINDING, POLISHING MACHINE**	High torque, Noiseless & Maintenance free **CONTINUOUSLY VARIABLE SPEED**: upto 800 rpm **DISC DIA**: 200mm,**MOTOR CAPACITY**: ½ HP (double motor)	2
02.	**BELT GRINDER/ POLISHER**	Dependable belt grinder with completely enclosed structure for initial grinding of metallographic specimen **MOTOR**: 0.5Hp, 230v, single phase,**ENDLESS BELT**: (100x915) mm Recessed work area for long samples,Dynamic well balanced rollers. Water faucet for immediate rising for avoiding or heating.	2
03.	**STANDARD METALLOGRAPHY MICRO SPECIMEN SET**	EACH SET SHOULD CONTAIN THE FOLLOWING SPECIMENS (1 FROM EACH): PLAIN CARBON STEEL: Dead Mild Steel. Mild steel. Medium Carbon steel. High carbon steel. Eutectoid carbon steel HEAT TREATED SPECIMENS: Annealed. Normalised. Full Hardened. Hardened and tempered. Case Carburised. Nitrided. Spherodised CAST IRONS: Gray cast iron (Unetched). Grey cast iron (Etched)Spheroidal Gray Cast Iron (unetched)Spheroidal Gray Cast Iron (etched) Mottled cast iron. White Cast Iron Austempered Ductile Cast Iron Ni- Hard. Ni- Resist.Compacted Gray Cast Iron NON FERROUS SPECIMENS: Aluminium Precipitation Hardened Copper Solution Annealed Brass 60 / 40. Brass 70 / 30. Phosphor Bronze. TYPICAL MICROSTRUCTURE SPECIMENS: Dendrite. Decarburised. Carbide Network Hooky / Blockey carbides. Retained Austenite Bainite (lower / upper). Banding of pearlite and ferrite Widmanstaten microstructure Non Metallic Inclusions (in Steel). Lamellar Pearlite MECHANICAL WORKED: Equiaxed grains. Elongated Grains STAINLESS STEELS: Duplex Steel (Ferrite / Austenite).Mechanical Twins OTHERS: Titanium. Powder Metallurgical compact Ceramic, Tool Steel,Sintered Carbide, Welded structure, Coated / Plated Samples & Metalized.	2 (Set)

4(a)	**INVERTED METALLURGICAL MICROSCOPE WITH MICROHARDNESS TESTING ATTACHMENT**	**VIEWING BODY**: binocular head, inclined 30^0,able to rotate a full 360^0 **NOSE PIECE**: quadruple **MECHANICAL STAGE SIZE** :150mmx 150mm **RANGE OF MOTION** : 15mm x 15mm with single spring clip **FOCUSING MECHANISM**: adjustable tension controlled, coarse and fine knobs with dial marking adjustable up-stop **ILLUMINATION**:6 volt ,20 watt halogen bulbs with intensity control **EYEPIECES**: wide field-10x 16x 20x (filer eyepiece) **OBJECTIVE LENS** : panchromatic 10x20x40x60x100x,dry **MICROSCOPIC ACCESSORIES**: Dust cover , color filter set ,spare 2 nos of halogen lamps and fuses **MICRO HARDNESS ATTACHMENT** :Unique attachment to estimate micro Vickers hardness (qualitatively) of any phase, layer ,case, plating, coating etc. consisting indenter assembly, dedicated embedded electronics , software **OPTICAL PROFILER**: Helping to estimate particle / feature height with the help of Z stacking imaging. Algorithm and with z motion calibration, making 3D imaging possible. **ILLUMINATION TECHNIQUES:** Dark field illumination and Differential interference contrast (DIC)	5 no :- 1(with micro hardness attachment & image analyzer) + 04(without micro hardness attachment & image analyzer)
(b)	**MICROHARDNESS TESTER CUM IMAGE ANALYZER(LICENSED SOFTWARE)**	HARDWARE DIGITAL CMOS CAMERA WITH BUILT-IN IMAGE GRABBING High resolution (3 mega Pixel) Camera (technical) (with built-in image grabbing facility).Very low weight, small size camera that is directly attached to any lap-top computer through USB port. Attached to the microscope by “C “mount adaptor. 3.0MP colour CMOS Camera SENSOR :1/2 "color 3.0MP CMOS MOUNT : C/CS mount POWER SUPPLY : USB 2.0 TRANSMISSION SPEED : 30 fps	1

5-	**UPRIGHT METALLURGICAL MICROSCOPE**	VIEWING BODY :Trinocular Sidentoff MAIN STAND :Reflected light large stand FOCUS DRIVE: mechanical stage size: 150mm X 150mm; Range of motion 75mm X 75mm, with single spring Clip ILLUMINATION SYSTEM :White light LED with intensity control, CONTRASTING METHODS: Bright field , Cross polariser OBJECTIVE NOSEPIECE: Manual fourfold OBJECTIVE : Plan 10X, Plan 20X, Plan 50X, Plan 100X EYE PIECES: WF 10X (In pair) Graduated eyepiece (10 mm X 100 part) For rapid measurement (0.1mm L.C.) Grain size eyepiece (8 Grain engraved) OPTICAL ADAPTOR: 0.5x **ACCESSORIES** : 1. Dust cover. 2. Lamps -2Nos..3. Spares fuse 2 Nos. 4. Working manual 5. Sample leveller. **OPTIONAL ACCESSORIES** : 1. Filar micrometer eyepiece (0.001 mm L.C.) For critical / accurate linear measurement. 2. Halogen Bulb 12V, 30 W 3. Austenite Grain Size Turret Eyepiece as per ASTM	1
6-	**HOT AND COLD MOUNTING PRESS**	Dual mould capability Pneumatically operated Reliable microcontroller based technology offering complete automation like pressing, heating, holding, cooling (Air/water circulation) Transparent mould capability enabling seeing identification mark Easy mould interchange ability Fast mould production Moulds produced – 1 “ , 1 ¼ “ , 1 ½ “ HEATER : 1000 Watts TIMER: buzzer facilities, automatic cycles COOLING :Automatic water circulation AIR PRESSURE REQUIRED : 150 PSI ELECTRICAL SUPPLY : Single phase	1
7(a)	ABRASIVE GRINDING BELTS	DRY ENDLESS SILICON CARBIDE BELTS. SIZE: 4''x 36''. Grit 60, 80 , 120 -10 / Box or fine & coarse DRY ALUMINUM OXIDE BELTS. SIZE: 4'' x 36''. Grit 60, 80, 120	20

(b)	**ABRASIVE GRINDING/polishing PAPERS**	Superior wet/dry Silicon carbide abrasive papers. Plain/P.S.A. (Pressure sensitive adhesive) back. PAPER 9”x11” Grit-80,120,180,240,320,400 ROUND DISCS-8”(200 mm)dia. Plain/PSA backed Grit-80,120, 180,240,320,400 ROUND DISCS-10”(250 mm)dia. Plain/PSA backed Grit-80, 120, 180,240,320,400 ROUND DISCS-12”(300 mm)dia. Plain/PSA backed Grit-80, 120, 180,240,320,400	**20 from each grit**
8(a)	**COLD MOUNTING DIE SET**	The set comprises bottom ground plate, die plate with holes of 1'', 1½'', 1 '' with release angle and a cover plate	**2 sets**
(b)	**HOT MOULDING POWDERS**	Black, Red and Green Phenolic powders with special qualities like relatively low shrinkage, higher Shore hardness, high strength, are offered for routine metallographic applications. These can sustain singular grinding (manual) and even multiple specimens (automatic machine’s) pressures. The resins offer perfect bond at the interfaces for edge studies.	**5 kg**
(c)	**COLD MOUNTING SYSTEM**	Cold setting resin 5kg and required amount of Solvent, brass dies(25mm) 4 nos	**1**
(d)	**MOULD RELEASE SPRAY**	It is advisable to spray the lubricant spray before hot and cold compression for easy ejection.	**2**
9(a)	**ALUMINA POLISHING SUSPENSION (UNIVERSAL GRADE)**	Lavigated Alumina suspension for routine ferrous and non ferrous laboratory applications.	**5 kg**
(b)	**POLISHING CLOTHS**	For Alumina suspension	**4 mts**
(c)	**POLISHING STAND**		**20 nos**
10(a)	**SPECIMEN LEVELLER**		1
(b)	**ODD SHAPED COMPONENTS AUTO – LEVELLING FIXTURE**		1
(c)	**GRAIN SIZE RATICLE EYEPIECE**		1
(d)	**INCLUSION COMPARISON RATICLE EYEPIECE**	7.1 X 7.1 mm square	1
(e)	**BENCH MAGNIFIER**	3.5 X	1
(f)	**MOTORIZED STAGE WITH STAGE CONTROL PROGRAM FOR ANY UP-RIGHT MICROSCOPE**		1
(g)	**PRECISION VICE**	For holding samples.	1
(h)	**MANUAL PREPARATION SAMPLE STAND**	For student’s use	1
(i)	**PRECISION X – Y STAGE, L.C. 5 MICRONS**		1

PACKAGE- V

LIST OF EQUIPMENT FOR "MINERAL PROCESSING LABORATORY"'

DEPARTMENT- "METALLURGICAL ENGINEERING".

<table>
<tr><th>Sl. No.</th><th>Name of Equipment</th><th>Detailed specification.</th><th>Quantity.</th></tr>
<tr><td>1-</td><td>JAW CRUSHER</td><td>Body: M.S.
Shaft: High Carbon Steel (EN 8). Jaw-10-14% Mn Hadfield steel
Allowed feed size: 75-125mm.Product size:-6mm.
Motor:1.5 Kw (minimum)</td><td>1</td></tr>
<tr><td>2-</td><td>BALL MILL</td><td>Outer Material :MS (2-5mm)
Inner lining:12-14% Mn steel(at least 12.5mm thick)
Mill size:18"(L) X 30" (ϕ). 5Hp motor (max)
Grinding Media: Cast SS steel ball (1" to 3")
Total volume of the media should be at least 50% of mill' internal volume. Accessories: Grindability index calculator to be attached.</td><td>1</td></tr>
<tr><td>3-</td><td>TRAY TYPE VIBROSCREEN</td><td>Screen tray size: 600 X 600 X 90 mm
Screen set 1: 100,90 .....10mm
Screen set 2: 9,8.....1mm with pan
Screen type: wire mesh
Or, Any other standard specification</td><td>1</td></tr>
<tr><td>4-</td><td>ROLL CRUSHER</td><td>Roll size :100mm(dia) X 200 mm (length)
Body Material: Mild Steel. Adjustable roll gap.
Roller lining: High Mn(10-12% steel).Feed size : 10mm
Product size :-2mm</td><td>1</td></tr>
<tr><td>5-</td><td>PULVERIZER</td><td>Laboratory Scale-10 kg/hr. output, 2hp motor drive.</td><td>1</td></tr>
<tr><td>6-</td><td>DISC PELLETIZER</td><td>Product Size:3-30mm. Disc Size: 375-500 mm
Variable pan angle:0- 60^0 .Pan assembly to be motorised
Product: 1-5Kg /hr. Material: stainless steel</td><td>1</td></tr>
<tr><td>7-</td><td>FLOATATION CELL
(LABORATORY SCALE)</td><td>3 Floatation Tanks of 3 Liters SS make</td><td>1</td></tr>
<tr><td>8-</td><td>WILFLEY TABLE</td><td>Table size :2' X 4' (approximately)</td><td>1</td></tr>
<tr><td>9-</td><td>MECHANICAL JIG
(LABORATORY SCALE)</td><td>Simplex type. Feed Size:6-20mm & Power : 1 Hp motor</td><td>1</td></tr>
<tr><td>10</td><td>ROTAP SIEVE SHAKER WITH SIEVE SETS.</td><td>screen : 15 screens plus Pan with top lid
sieves: ASTM standard sieve series
<table>
<tr><th>Sl no</th><th>Mesh number</th><th>Aperture (in mm)</th></tr>
<tr><td>1</td><td>4</td><td>4.699</td></tr>
<tr><td>2</td><td>6</td><td>3.362</td></tr>
<tr><td>3</td><td>8</td><td>2.362</td></tr>
<tr><td>4</td><td>10</td><td>1.651</td></tr>
<tr><td>5</td><td>14</td><td>1.168</td></tr>
<tr><td>6</td><td>20</td><td>0.833</td></tr>
<tr><td>7</td><td>28</td><td>0.589</td></tr>
<tr><td>8</td><td>35</td><td>0.417</td></tr>
<tr><td>9</td><td>48</td><td>0.295</td></tr>
<tr><td>10</td><td>65</td><td>0.208</td></tr>
<tr><td>11</td><td>100</td><td>0.147</td></tr>
<tr><td>12</td><td>150</td><td>0.104</td></tr>
<tr><td>13</td><td>200</td><td>0.074</td></tr>
<tr><td>14</td><td>270</td><td>0.052</td></tr>
<tr><td>15</td><td>400</td><td>0.037</td></tr>
</table>
Dia of each screen: 200 mm. Power input: 230 V(single Φ) , 1.5 Kw power</td><td>1</td></tr>
</table>

PACKAGE- VI

LIST OF EQUIPMENT FOR "HEAT TREATMENT LABORATORY"

DEPARTMENT -"METALLURGICAL ENGINEERING".

Sl. No.	Name of equipment	Detailed specification	Quantity.
1-	**MUFFLE FURNACE**	Chamber size: 6"x6"x12" (HxWxD) (150x 150x300mm) Electrical rating: 3.00 Kw. , 230V, single phase AC Lining: ceramic fiber Outer lining: Mild steel Heating Element: Kanthal-A1 (14,S.W.G) Thermocouple: chromel/ Alumel Three layer thermal insulator Max. Temp: 1200^0 C Working temp: 1050^o C (with temperature indicator) Loading: Horizontal Control panel: with ammeter, illuminating on-off. Switch, air break, contactor, single set point digital temperature controller.	**2**
2-	**JOMINY END QUENCH HARDENABILITY SET UP**	Special vertical furnace At a time 3 Jominy test must be carried out Special tong for quick transfer of specimen to quenching fixture Motorized water tank with storage and test tank	**1**
3-	**SALT BATH**	Preheating : 700°C Medium heat : 1000°C High heat : 1250°C Tempering : 500°C Application: tools heat treatment	**1**
4-	**MUFFLE FURNACE**	Inside chamber Size: (9"x9"x14") WxHxD mm Standard Working Temperature: 1200^0 C (continuous) Maximum Working Temperature: 1300^0 C Temperature Control programmable & PID auto control Heating Element MoSi 2 Working Voltage: AC, 440V , 50Hz, 3 phase Max. Power: 5KW Thermocouple: "B" type dia 0.4mm PT-Rh to PT-Rh wire	**1**
5-	**CARBAURIZING BOX**	Material: cast iron Size: 4"x4"x6" with lid	**1**
6	**HEAT TREATMENT ACCESSORIES**	Tonges (2 ft & 1 ft)	**2**
7	**INDUCTION MELTING FURNACE**	maximum temperature: 1200 POWER: 3 PHASE 400VAC ,5Kw crucible capcity: 2 litres crucible type: silicon carbide/graphite metals: copper ,aluminium, silver integrated air cooling.	**01**
8	**HEATING MANTLE**	Maximum temperature: 1000^0C Single phase , 230V AC .Capacity: 2 Litres	**01**

PACKAGE- VII

LIST OF TECHNICAL BOOKS

Sl. No.	Name of Book	Name of Author	Publisher's name.	Quantity required.
	MECHANICS OF MATERIALS			
1	Strength of Material	R.K Rajput	S.Chand	10
2	Engineering Mechanics & Strength of Materials	S.Ramamrutham		5
3	Strength of Material	R.S.Khurmi		10
4	Mechanics of material	H.C.Hibbler		1
5	Engineering Mechanics & Strength of Materials	R.K.Bansal		1
6	Strength of Material	G.H.Ryder		1
7	Text Book of Mechatronics	R.K Rajput	S.Chand	30
8	Element of Strength of Material	S.P. Timoshenko, D.H.Young		1
9	Mechatronics	W.Bolton	Pearson	5
10	Strength of Material	James Gere & Goodno		1
	FLUID MECHANICS & HYDRAULIC MECHACHINES			
1	Fluid Mechanics and Machinery	R Berndtsson, CSP Ojha & P N Chandramouli		1
2	Fluid Mechanics	R.K Bansal		10
3	Fluid Mechanics	RK Rajput		10
4	Hydraulic Pneumatic Control	Majumdar		2
5	Hydraulic Pneumatic Control	K Shanmuga Sundaram		15
6	Fluid Power Control	J.F. Blackburng, Reethof & J.L.Shearer		1
	THERMAL ENGINEERING			
1	Thermal Engineering	R.S.Khurmi		10
2	Thermal Engineering	R.K Rajput		10
3	Thermal Engineering	Y.Cengel		1
4	Thermal Engineering	A.S.Sarao		1
5	Thermal Engineering	D.S.Kumar		1
6	Thermal Engineering	Y.V.C. Rao		1
7	Thermal Engineering	M Rathore , Mahesh		5
	THEORY OF MACHINES			
1	Theory of Machines	R S Khurmi		10
2	Theory of machine	Thomas & Bevan		1
3	Theory of Machine	R.K.Bansal		5

	MANUFACTURING TECHNOLOGY			
1	Production Technology, Vol- I & II	O.P. Khanna		5+5
2	Workshop technology, Vol- I & II	B.S Raghuwanshi	Dhanpat Rai	5+5
3	Manufacturing Technology	A.K.Ghosh & Mallick		1
4	Workshop technology	R.S Khurmi	S.Chand	5
5	Work shop Technology Part-I & II	W.A.S Chapman		1+1
6	A Textbook of Material Science and Metallurgy	O.P.Khanna		5
	MACHINE DESIGN			
1	A text book of Machine Design	R.S. Khurmi & J.K. Gupta	S.Chand	10
2	A text book of Machine Design	P.C. Sharma & D.K. Agarwal	S.K Kataria & Sons	1
3	Design of machine element	V.B. Bhandari	TMH	1
4	Machine Design	P. Kanhaia		1
5	Design data Handbook	S. Md. Jalaluddin	Anuradha Publication	20
	APPLIED THERMODYNAMICS			
1	Refrigeration and air conditioning	R.S. Khurmi	S. Chand	10
2	Refrigeration and air conditioning	S.C. Domkundwara & Arora	Dhanpat Rai & Sons	1
3	Refrigeration and air conditioning	R.K.Rajput		1
4	Mechanical Vibration	v.p.singh		5
5	Heat Transfer	R.K.Rajput		10
6	Power plant Engineering	R.K.Rajput		10
7	Heat Transfer	P.K.Nag		1
8	Refrigeration and air conditioning	C.P Arora	TMH	1
	INDUSTRIAL ENGINEERING & QUALITY CONTROL			
1	Industrial Engineering & Management	O.P. Khanna	Dhanpat Rai	5
2	Industrial Engineering & Production Management	Telesang	S.Chand	1
	AUTOMOBILE ENGINEERING			
1	Automobile Engineering	R.B.Gupta	Satya Prakashan	5
2	Automobile Engineering Vol- I & II	Dr Kirpal Singh	Standard Publishers	1+1
3	Automobile Engineering	C.P.Nakra	Dhanpat Rai Publication	5
4	Automotive Engine	W.H.Course	McGraw Hill	1

	CAD & CAM			
1	CAD& CAM	Mikel P.Groover	Pearson	1
2	CAD& CAM	Dr. P.N. Rao	TMH	1
3	CAD/ CAM/CIM	R.Radhakrishnan & S.Subramanian	New age	10
4	CAD& CAM	V.Raju		1
5	steam table & charts	k.k. ramalingam		20
6	Refrigeration & Psychometric chart	sc jain,S.S. Banwait		5
7	Refrigeration & Psychometric chart	R.s. Khurmi		5
8	I.c. engine & gas turbine	R. yadav		1
9	I.c. engine & gas turbine	v. ganeshan		1
10	I.c. engine & gas turbine	mathur & sharma		1
11	I.c. engine	I.C. Gupta		1
12	gasturbine	Rogers		1
13	Mateial science	G.B. Narang		1
14	Mateial science	V. Rajendran		1
15	Mateial science	M.s. Vijaya		1
16	Heat Transfer	J.p. Holman		1
17	Automobile Engineering	G.B. Narang		1
18	Automobile Engineering	R.K. Rajput		5
19	Automobile Engineering	K.M. Gupta		1
20	Machine Design	Sigley		1
21	Object Oriented programming C++	Balguru Swamy		10
22	Object Oriented programming C++	Benugopal		5
23	Object Oriented programming C++	Ashok Kamthane		5
24	Objective of Mechanical engg.	R.S.KHURMI	s.chand	5
25	Objective of Mechanical engg.	R.K JAIN	Khanna publication	5
26	Mechanism and machines	J.S.Rao and R.V.Dukipatti	Newage international	5
27	Fundamental of metal casting technology	p.c mukharjee	Oxford PIBI	2
28	Mechanical Measurements	T.G.Beckwith and N.Lewis Buck	Oxford & IBH Publication	1
29	IOT	Jeeva Josh		60
30	Heat Transfer	Mahesh Rathore		5

LIST OF TECHNICAL BOOKS

Sl. No.	Name of Book	Name of Author	Publisher's name.	Quantity required.
1	Engineering Drawing	M. Chakravorty		10
2	Soil Mechanics and Foundation Engg	B.C Punmia	Laxmi Publisher	10
3	Soil Mechanics and Foundation Engg	K.R Arora		5
4	Irrigation Engineering	N.N Basak,	M.C. Grawhill	10
5	Analysis of Structure	V.N Vazirani Vol-I	Khanna Publisher	10
6	Analysis of Structure	V.N Vazirani Vol-II	Khanna Publisher	10
7	Objective Book	R.S Khurmi	S.Chand	2
8	Environmental Studies	B.K. Mohapatra		10
9	Highway Engineering	S.k Khanna	Nem Chand and Bros	10
10	Civil Engg. Handbook		Made Easy	20
11	Geotechnical Engg	T.N. Ramamurthy		10
12	Design of Steel Structure	S.K. Dugal		10
13	Civil Engg. Lab 1	M.R. Samal		10
14	Civil Engg. Lab 2	M.R. Samal		10
15	Estimation & Costing	B.N. Dutta		10
16	Environmental Studies	N.N Basak		10
17	Design of Concrete Structure	B.C Punmia		10
18	Disaster Management	Tej Singh		5
19	Designing and Decorating Interiors	David Van Dommalan		5
20	Time Saver Standard for Interior Design and Space Saving	J.D. Chiara, J. Panch, M. Zelnik		5
21	Revised Code Book - IS 456,IS 800, SP 16			5
22	National Building Code of India		BIS	5
23	Steel Table	R.Agor		20
24	Fundamentals of Construction Planning and Management	M.R. Sharma		10
25	Entrepreneurship Development and Management	R.K. Singhl	Katson Books	10
26	Entrepreneurship Development and Management	Vasant Deshai	Himalaya Publication	10

LIST OF TECHNICAL BOOKS.

Sl. No.	Name of Book	Name of Author	Publisher's name.	Quantity required.
1	Electrical Technology Vol II	B.L. Thareja	S.Chand	30
2	Principle of Power System	V.K. Mehta	S.Chand	30
3	Fundamental of Electrical Engineering	Asfaq Huessain	Dhanpat Rai	20
4	Electrical Objective	J.B Gupta	Dhanpat Rai	2
5	Electrical Objective	Harish Ray	Galgotia	2
6	Electrical Drawing	Surjit Singh	Dhanpat Rai	5
7	Electrical Drawing	C.R Dargan	Asian Publisher	20
8	Principle of Electronics	V. Mehta	S. Chand	30
9	Electrical Technology Vol-I	B.L Thereja	S.Chand	20
10	Fundamental of Microprocessor and Microcontroller	B. Ram	Dhanpat Rai	10
11	Fundamental of Digital Design	M.Senthil, Siv kumar	S.Chand	2
12	Fundamental of Electrical Engineering & Electronics	B.L. Thareja		10
13	Matlab and Simulation	Rudra Pratap		20
14	Laboratory course in electrical engg.	S.G.Tarnekan &kharbanda	s.chand	5
15	Basic Electronic lab manual	Paul B.Zban	s.chand	5
16	Matlab and Simulink for Enggiem	Agam ku.tyagi		10
17	Matlab Demystified	k.k.sarma	vikash	5
18	Power electronic	M.H.Rashid	PHI	10
19	Power system protection & switch Gear	Bhubanesh Oza	SCITECH	5
20	Protection & switch Gear	Raghuraman	Khanna Publisher	10
21	Utilization of Electrical energy & traction	G.C.Garg	Khanna Publisher	10
22	Utilization of Electrical energy	E.I.Taylor		5
23	HVDC Power Transmission System	K.R.Padiyan	New age int. publication	5
24	Introduction to circuit network	Gargi Basu	PLATINUM	5
25	Circuit theory, analysis	A.Chakrabarty	Dhanpat Rai	5
26	A Text Book of Electrical Machines	K.R.Siddhapuna	vikash	5
27	A Text Book on Power System Engineering.	Soni,Gupta, Bhatnagan	Dhanpat Rai	2
28	Power Electronics	N.Mahan	WILLEY	2
29	Programmable Logic Controller	Frank D Petruzela	TMH	2
30	Programmable Logic Controller	M.Mitra & S.Sengupta		10
31	ABC of Electrical Engineering	Jain & Jain		10
32	Electronics Circuit	R.S Sedha		5
33	Digital Electronics	B.R.Gupta & V.Singhal		5
34	Principle of Electronics	S.K.Sahadev		10
35	Concept of Basic Electrical Engineering.	P.K.DAS		20
36	Electronics Lab Premier	Sasikala		2

LIST OF TECHNICAL BOOKS.

Sl. No.	Name of Book	Name of Author	Publisher's name.	Quantity required.
1	Phase Transformation in Metals and alloys	David A. Porter and K.E. Easterling		1
2	Material Science and Engineering	William Callister		1
3	Metallurgical Thermodynamics and Kinetics	Ahindra Ghosh		2
4	Physical Metallurgy	Vijendra Singh		10
5	Corrosion Engineering	Mars G. Fontana		5
6	Elements of x-ray Diffraction	B.D Cullity		1
7	Fundamentals of Mineral Dressing	C. Mohapatra	JJTP,BBSR	30
8	Fuels and Refractories	O.P Gupta		20
9	Mechanical Testing of Engineering materials	Chinmaya Mohapatra		20
10	Introduction to Engineering Materials	Chinmaya Mohapatra		5
11	Principle of Extractive Metallurgy	A. Ghosh & H.S. Ray		5
12	Metallurgical Objective Book	O.P. Gupta		2
13	Metallurgical Objective Book	Arbind Kumar		10
14	Elements of Fluid Mechanics	V.C. Shesadri & U.Patankar		10
15	Practical Physical Metallurgy	Rawlings		1
16	Heat Treatment	Rajan Sharma		10
17	Steel Making	A.K. Biswas		10
18	Chemistry of Steel	Badsworth		1
19	Metallurgy Technology and Materials	K. B. R. Varma	Trans Tech	1
20	The Physics of Metals	Seitz F.	McGraw-Hill Book company	1
21	A Text-Book of Metallurgy	R. Bailey		2
22	Physical Metallurgy Handbook	Anil Sinha	McGraw-Hill Book company	2
23	Laboratory Manual for a Service Course in Metallurgy	Boore, William F		10
24	Metallurgy for the Non-Metallurgist	Chandler, Harry		2
25	Chemical metallurgy_ principles and practice	Chiranjib Kumar Gupta		1
26	An Introduction to Metallurgy	Cottrell A.		2
27	Metallurgy Fundamentals	Daniel A. Brandt, J. C. Warner	Goodheart-Wilcox Publisher	1
28	Physical Metallurgy	Haasen P., Mordike B.L.		2
29	Physical metallurgy _ principles and design	Haidemenopoulos,GregoryN		2
30	An Introduction to Metallurgy	James D. Dufour		1
31	Physical Metallurgy	R.W. Cahn, P. Haasen		2
32	Fundamentals of Metallurgy	S. Seetharaman		1
33	Powder metallurgy	S. A. Tsukerman		2

LIST OF BOOKS.

Sl. No.	Name of Book	Name of Author	Publisher's name.	Quantity required.
	MATHEMATICS			
1	Ordinary & Partial disf.equation	Sinha Roy padhy	Kalyani pub	1
2	Numerical Methods	M.K Jain,S.R.K Iyenger,R.k jain	New age int. publication	1
3	Quicker maths	M.Tyra &K.kundan	bsc	2
4	Quantitative Aptitude	R.S Agarwal	S.Chand publication	5
5	Objective Arithmatic	R.S.Agarwal	S.Chand publication	5
6	Advanced Engg.Math	P.V.O Neil,cengage learniy		2
7	Fourier series &integral transform	Dr.S.Sreenadh Prasad,Ramesh Babu		1
8	An introduction to Fourier series &integrals	Robert T.Seeley		1
9	Mathematical Methods	Potter Goldberg	PHI	1
10	Fundamental of Complex Analysis	E.B.Saft,A.D.sridher	3rd edition, Pearson	1
	PHYSICS			
1	Text book of Engineering Physics		Kalyani publication	30
2	Concept of physics vol-I	H.C Verma	Bharati bhawan publication	5
3	Concept of physics vol-II	H.C Verma	Bharati bhawan	5
4	objective physics vol-I		Dinesh publication	5
5	Objective physics vol-II		Dinesh publication	5
	CHEMISTRY			
1	Objective Chemistry	P.N.KAPIL	S.Dinesh &co.	10
2	Text Book of Engg. Chemistry	Y.R.SHARMA	Kalyani pub.	20
	ENGLISH			
1	Communicative English	Abhisek Arora		50

LIST OF BOOKS.

Sl. No.	Name of Book	Name of Author	Publisher's name.	Quantity required.
1	Oxford Advanced Learner's Dictionary (Eng-Eng)			2
2	Oxford Advanced Learner's Dictionary (Eng-Oriya)			2
3	The Story of my Life	Hellen Keller		1
4	Wings of Fire	A P J Abdul Kallam		1
5	Ignited Mind	A P J Abdul Kallam		1
6	Secret of Billion	A P J Abdul Kallam		1
7	Jungle Book	Rudyard Kipling		1
8	Karukku (Translation)	Bama		1
9	You Can Win	Shiv Khera		1
10	Malgudi Days	R K Narayan		1
11	Swami and his Friends	R K Narayan		1
12	A Critique of Pure Reason	Immanuel Kant		1
13	A Farewell To Arms	Ernest Hemingway		1
14	The Old man and the Sea	Ernest Hemingway		1
15	For Whom the bell tolls	Ernest Hemingway		1
16	A Passage to India	E.M Forster		1
17	Passage to England	Nirad C. Choudhury		1
18	Anand Math	Bankim Chandra		1
19	Gitanjali	Rabindra Nath Tagore		1
20	An Autobiography	Jawaharlal Nehru		1
21	In Evil Hour	Gabriel Garcia Marquez		1
22	One Hundred Years of Solitude	Gabriel Garcia Marquez		1
23	Chronicle of a Death Foretold	Gabriel Garcia Marquez		1
24	Crime and Punishment	Dostoyvsky		1
25	Godan	Prem Chand		1
26	Half a Life	VS Naipul		1
27	Hindu View of Life	S. Radhakrishnan		1
28	Ideas and Opinion	Einstein		1
29	Intimacy	Jean Paul Sartre		1
30	The Lives of others	Neel Mukherjee		1
31	Discipline and Punish	Michel F		1

32	Death of a Discipline	Gayatri Chakravorty Spivak	Columbia University press	1
33	In other worlds	Gayatri Chakravorty Spivak		1
34	Can the subaltern speak	Gayatri Chakravorty Spivak		1
35	Who sings the nation -state?	Gayatri Chakravorty Spivak		1
36	Identity:the real me	Homi k Bhaba		1
37	The location of culture	Homi k Bhaba		1
38	orientalism	Edward W Said		1
39	Culture and imperialism	Edward W Said		1
40	The Wretched of the Earth	Frantz Fanon		1
41	Black skin white mask	Frantz Fanon		1
42	A Dying colonialism	Frantz Fanon		1
43	Being and Nothingness	Jean Paul Sartre		1
44	What is literature	Jean Paul Sartre		1
45	The age of reason	Jean Paul Sartre		1
46	The second sex	Simone de Beauvoir		1
47	A very easy death	Simone de Beauvoir		1
48	The mandarins	Simone de Beauvoir		1
49	All men are mortal	Simone de Beauvoir		1
50	The plague	Albert camus		1
51	The myth of sisypus	Albert camus		1
52	The metamorphosis	Frantz kafka		1
53	The trial	Frantz kafka		1
54	Crime and punishment	Fydor Dostoevsky		1
55	War and peace	Leo tolstoy		1
56	Anna karenina	Leo tolstoy		1
57	resurrection	Leo tolstoy		1
58	The seagull	Anton chekhov		1
59	The cherry orchard	Anton chekhov		1

PACKAGE- VIII

LIST OF CHARTS.

DEPARTMENT- "METALLURGICAL ENGINEERING".

Sl. No.	Name of chart (IV Materials and metallurgy charts)	Quantity
1	Types of Crystal Structures	1
2	a Lattice Defects -I: Point	1
3	b Lattice Defects- II: Line/ Surface/ Volume	1
4	Heat Treatment Processes: Annealing, Normalizing, Hardening/Quenching, Tempering, and Surface Hardening.	1
5	T T T Diagram(Time, Temperature, Transformation)	1
6	Iron - Carbon Diagram	1
7	Cupola Furnace	1
8	Grain Size	1
9	Cu-Zn Diagram & Cu-Su Diagram	1
10	Comparison of Optical & Electron Microscope	1
11	Hardness Conversion Table	1
12	Cooling Curve for Pure iron	1
13	Iron-Iron Carbide Equilibrium Diagram	1
14	Induction Hardening Coils	1
15	Specific Effects of Alloying	1
16	Comparative Properties of some tool steels	1
17	Cu-Silicon Phase Diagram (Cu-rich)	1
18	Titanium Alloys phase Diagram	1

LIST OF CHARTS
DEPARTMENT- "CIVIL ENGINEERING"

Sl. No.	Name of Chart	Quantity
1	Vicat's Apparatus	1
2	Slump Test	1
3	Rebound Hammer	1
4	Types of Trusses	1
5	Types of Foundation	1
6	Nomenclature of Stair	1
7	Types of footing	1
8	Civil Symbol	1
9	Classifications of Stairs	1
10	Reinforcement in Staircase	1
11	Reinforcement in Beam	1
12	Reinforcement in Footing	1
13	Reinforcement in Column	1
14	Drawing of UTM (Machine & Samples)	1
15	Hydrometer Analysis	1
16	Triaxial Shear Test	1
17	Standard Proctor compaction Test	1
18	Liquid limit	1
19	Theodolite and Levelling instruments	1
20	Total Station instrument	1
21	Dumpy level	1
22	Water purification plant-I	1
23	Sewage treatment plant-I	1
24	CBR Value test	1
25	Door & Its Types	1
26	Types of window	1
27	Grillage Foundations	1
28	Types of Arch	1
29	Construction Joints	1
30	M. Visvesvaraya	1

LIST OF CHARTS

DEPARTMENT- "ELECTRICAL ENGINEERING".

Sl.No.	Name of Chart	Quantity
1	To find the error in CRO and Function Generator of your lab	1
2	Transistor Characteristics	1
3	Oscillator	1
4	Logic Gates	1
5	Flip-Flops: SR,T,D.	1
6	Flip-Flops: JK, Master-Slave JK	1
7	Network Theorems	1
8	Representation of Basic Circuits in Terms of Frequency Domain	1
9	Filters	1
10	8085 Block Diagram	1
11	8085 Set Instruction	1
12	8085 Interrupts	1
13	8086 Pin-layout & Architecture	1
14	Applications Op-Amp-2: Amplifier, Oscillator & Comperator	1
15	Treatment Against Electric Shock	1
16	Electrical Accessories - I	1
17	Electrical Accessories - II	1
18	Procedure of Making & Joint	1
19	Basic Electrical Symbols	1
20	Mercury Vapour Lamps	1
21	Fluorescent Tubes	1
22	Sodium Vapour Lamps	1
23	Chopper Circuits	1
24	Inverter Circuit	1
25	D.C. Motor	1
26	D.C. Generator	1
27	Cyclo Converters	1
28	D. C. MOTOR STARTER	1
29	Transformer	1
30	A.C. Generator	1
31	A.C. Motor	1

LIST OF CHARTS

DEPARTMENT- "MECHANICAL ENGINEERING"

Sl. No.	Name of Chart	Quantity
	SAFETY MEASURES	
1	Personal Protection	1
2	First Aid Materials	1
3	Fire Preventions	1
4	Machine Handling Safety Measures	1
5	Precautions in Workshop	1
6	Safety on Lathe Machine	1
7	Safety in Welding	1
	FITTINGS	
1	Hacksaws	1
2	Wrenches	1
3	Holding Tools (Types of Vice)	1
4	Striking Tools (Hammer)	1
5	Cutting Tools (Chisels)	1
6	Types of Files	1
7	Taps and Dies	1
	WELDING	
1	Electric Arc Welding	1
2	Gas Flames	1
3	TIG & MIG Welding	1
4	Welding Torches	1
	MACHINE SHOP/MACHINE TOOLS	
1	Lathe Machine	1
2	Shaping Machine	1
3	Drilling Machine	1
4	Grinding Machine	1
5	Milling Machine	1
6	Capstan Lathe Machine	1
7	Turret Lathe Machine	1
	AUTO-ENGINEERING	
1	Two-stroke operation	1
2	Four-stroke operation	1
3	Four-Stroke Petrol Engine	1
4	Four-stroke Diesel Engine	1
	SOM/TESTING OF MECHANICAL PROPERTIES CHARTS	
1	Drawing of UTM	1
2	Hardness Tests	1
3	Introduction to stress - strain curve-I	1

THEORY OF MACHINE CHARTS		
1	Governers: Centrifugal governor, Pendulum type:- Watt governor Loaded type,Dead weigh (porter & proell) Spring Controlled:- Hartnell.	1
2	Cams: Cam with knife-edge, Roller, Flat faced, Spherical faced & with offset follower, Cylindrical cam with reciprocating and oscillating follower. Terminology of radial cam.	1
3	Balancing (Rotating Masses): Single rotating mass by a single mass rotating in the same plane, Two masses in different planes when the plane of single rotating mass lies in between the planes of two balancing masses and when the plane of single rotating mass lies at one end of the planes of balancing masses. Balancing of several masses rotating in the same plane. Balancing of several masses rotating in different planes	1
4	Friction (Journal Bearing); Friction in journal bearing, Pivot and Collar bearing, flat pivot or foot step bearing, conical trapezoidal pivot bearing, flat collar bearing.	1
5	Epicyclic gear train	1
FLUID MACHINES & HYDRAULICS CHARTS		
1	Pressure Measuring Devices: Relationship; Simple Manometer: Piezometer, U- tube (for gauge & vaccum pressure) and single column manometer - vertical & inclined, Differential Manometer: U-tube differential & inverted UTube differential	1
2	Venturimeter	1
3	Orifices & Mouthpieces:	1
4	Francis Turbine	1
5	Kaplan Turbine	1
6	Impulse Turbine (Tangential Flow) Layout of a hydroelectric power plant, nozzle with a spear to regulate flow, Pelton turbine, Governing of pelton turbine & Runner of Pelton wheel.	1
7	7. Reaction Turbine (Radial & Axial Flow):	1
THERMODYNAMICS/ THERMAL CHARTS		
1	Compressors	1
RAC CHARTS		
1	Basic vapour compression refrigeration system	1
2	Refrigerant Conditions in Typical A.C. Unit.	1
AUTOMOBILES CHARTS		
1	Differential	1
2	Braking Systems	1

LIST OF CHARTS.

DEPARTMENT- "MATHEMATICS & SCIENCE".

Sl. No.	Name of Chart	Quantity.
1	jumbo periodic table	1
2	laboratory safety measures	1
3	Acid base and salts	1
4	principle of extraction	1
5	Chemical bonding	1
6	Advanced Jr. atomic model set (47 balls + 35 links) with flexible connectors and advanced balls.	1

LIST OF CHARTS.

DEPARTMENT-"ELECTRICAL ENGINEERING."

Sl. No.	Name of Chart (List No.13)	Quantity
1	Hard Disk Drive	1
2	CD Rom Drive	1
3	PC Motherboard	1
4	DOS Commands	1
5	Input devices	1
6	Output devices	1
7	Network Topologies	1
8	Transmission medias	1
9	Types of Computer Networks	1
COMPUTER PIONEERS		
1	First Generation Computer	1
2	Second Generation Computer	1
3	Third Generation Computer	1

ANNEXURE-I

Price Schedule on FOR basis (Item-wise) for Package-

Sl. No.	Item's Description with make, model, specification etc.	Unit price.	Rate of GST, as applicable.	Amount of GST	Total Price (Col-3+5)
01	02	03	04	05	07

(1) Bidder is required to furnish rates of the items as per the above format both in words & Figures.
(2)In case of discrepancy, the rate quoted in words shall be taken in to consideration.
(3)In case Discrepancy between unit price and total price, the unit price shall prevail.

ANNEXURE-II

PERFORMANCE SECURITY FORM

To

Bid No_____/dt.

The Principal, Notification of award No_____/dt.
Government Polytechnic Mayurbhanj,
At-Tikarpada, P.O-Shamakhunta, P.S-Baripada,
Dist-Mayurbhanj (ODISHA), Pin-757049.

WHERE IN,……..(Name of Supplier with address) herein after called "The Supplier" has under taken in pursuance of Contract for the above referred Bid to supply the equipment----------(Description of materials as per Notification of contract issued by you) herein after called " the Contract".

AND WHERE AS, it has been stipulated by you in the said Notification of Award that the Supplier shall furnish you with a Bank Guarantee by a Nationalized Bank for the Sum as specified therein as Security for compliance with the Supplier's Performance obligations in accordance with the contract.

AND WHERE AS, We have agreed to give the above named supplier a Bank Guarantee for the aforesaid purpose.

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you on behalf of the Supplier, up to a sum of Rs… (Amount of the Guarantee both in Words and Figures) and we undertake to pay you, upon your first written demand is received by us without any demur or arguments any sum or sums within the limit of…… (Amount of Guarantee) as aforesaid, without needing to prove or to show grounds or reasons for your demand of the sum specified therein.

This Guarantee is Valid until the……day of ……20…….

Date:-

Signature of Authority of Guarantor Bank
Address & Seal.

Note: The bank Guarantee should be executed on stamp paper in accordance with stamp Paper act. The stamp paper should be in the name of Executing Bank.

ANNEXURE-III

PERFORMANCE STATEMENT

(In proof of eligibility of bidders for the period of last three years)

Sl. No.	Order placed by the Organization with Address.	Order No & Date.	Type of equipment delivered.	Value of Order.

Bidder's Seal & Signature

ANNEXURE-IV

ORIGINAL EQUIPMENT MANUFACTURER'S AUTHORIZATION FORM

No._____/ Dated _____

To

The Principal,
Government Polytechnic Mayurbhanj,
At-Tikarpada, P.o-Poda Astia, P.S.-Baripada(Sadar),
Dist-Mayurbhanj, (Odisha), Pin-757049

REF: Tender Notice No-_____/GPM/dt.

Dear Sir,

We_____who are established and reputable manufacturer of_____ having Firm at_____(Address of Firm) here by authorize M/s._____ (Name and address of Agent) to submit a bid and sign the contract with you against the above Tender.

No Company or firm or Individual other than M/s. _____ are authorized to bid and conclude the contract in regard to this business against this specific IFB.

We hereby extend our full guarantee and warrantee as per general conditions of contract for the Equipment and services offered by the above firm against this Tender.

Yours Faithfully,

(Signature for and on behalf of Manufacturer)

Note: This letter of Authority should be on the letterhead of the manufacturer and should be signed by a person, competent and having the power of attorney to bind the manufacturer. It should be included by the Bidder in its bid.

ANNEXURE -V

CHECK LIST

(To be submitted by the Bidder in the outer Envelop)

Technical Bid

1-Accepted Terms & Conditions-	YES/NO
2-Demand Draft for Bid documents' cost	YES/NO
3-Demand Draft for EMD amount- (Package-wise for each package)	YES/NO
4-Detail specification along with leaflet, literature (As per Package-I to Package-VI)	YES/NO
5-Performance statements as per Annexure-III	YES/NO
6-Authorization from O E M as per Annexure-IV	YES/NO
7-GST Regn. Certificate-	YES/NO
8-GST return copy (valid)-	YES/NO
9-Income Tax Clearance Certificate (2019-20)/ PAN CARD	YES/NO

Bidder's Seal & Signature