

Procurement Plan Under Strive Scheme

NAME OF TRADE:- PUMP OPERATOR					
Sr.No.	Name of Items	Specifications	Trade/Course for which it is required	Total required	Method of Procurement (e.g. Shopping/Competitive Bidding) Ltd. Tender
1	Adjustable spanner(pipe wrench 350 mm)	Mererial- Drop Forged Steel	Pump Operator	2 Nos	-Do-
2	Air blow gun with standard accessories	Meterial -	Pump Operator	1 No	-Do-
3	Air impact wrench with standard accessories	company-TAPARIA	Pump Operator	2 Nos	-Do-
4	Air ratchet with standard accessories	Company-TAPARIA	Pump Operator	4 Nos	-Do-
5	Auto electrical test bench	2.5 width X 6 length feet	Pump Operator	1 No	-Do-
6	Bearing and gear tester		Pump Operator	2 Nos	-Do-
7	Cam lock type screw driver		Pump Operator	1 No	-Do-
8	Carge winches 3,5 tonnes	3to5 tonnes	Pump Operator	1 No	-Do-
9	Circlip pliers expanding and contracting type 15 cm and 20 cm each	15cm to 20cm	Pump Operator	2 Nos	-Do-
10	Cleaning tray 45x30cm	45*30	Pump Operator	4 Nos	-Do-
11	Compression testing gauge suitable for diesel engine	Compression testing gauge: - Analog Type - 2-1/2 inch gauge - Dual scale gauge reads 0-300 psi (0-2100 kPa)	Pump Operator	2 Nos	-Do-
12	Crab	Crab Tool : - Size : 6"	Pump Operator	1 No	-Do-
13	DC Ohmmeter 0 to 300 Ohms, mid scales at 20 Ohms	20 ohms	Pump Operator	4 Nos	-Do-
14	Different type of engine bearing model		Pump Operator	1 Set	-Do-
15	Electric soldering iron 230v 60 watts 230 v 25 watts	230 v	Pump Operator	2each	-Do-
16	Engineers square 700 mm	700mm	Pump Operator	4 Nos	-Do-
17	Flow meter 0-400Lt/min	400lt/min	Pump Operator	2 Nos	-Do-

18	Forks clips 02 tonnes (copa)	02tonnes	Pump Operator	1 No	-Do-
19	Forks clips 05 tonnes (copa)	05/tonnes	Pump Operator	1 No	-Do-
20	Growler		Pump Operator	2 Nos	-Do-
21	Hand key way broacher		Pump Operator	4 Nos	-Do-
22	Hand reamers adjustable 10.5 to 11.25 mm, 11.25 to 12.75 mm, 12.75 to 14.25 mm and 14.25 to 15.75 mm	10.5 to 11.5 mm 11.25 to 12.75 mm	Pump Operator	1 No	-Do-
23	Hydraulic wheel and bearing puller		Pump Operator	1 Set	-Do-
24	Ladle 150mm dia		Pump Operator	2 Nos	-Do-
25	Masonry bit(Assorted up to 12 mm)	Lifting Jack Screw Type: -Capacity: 3 Ton	Pump Operator	4 Nos	-Do-
26	Master test bars (different size)		Pump Operator	1Set	-Do-
27	Multimeter digital		Pump Operator	1 Set	-Do-
28	Plumb bob		Pump Operator	4 Nos	-Do-
29	Ratchet chain pulley		Pump Operator	1 No	-Do-
30	Scientific claculator		Pump Operator	1 No	-Do-
31	scriber with scribig black universal		Pump Operator	2 Nos	-Do-
32	Sher tin mans 300mm	300mm	Pump Operator	1 No	-Do-
33	Spark lighter		Pump Operator	4 Nos	-Do-
34	Square T-wrenches		Pump Operator	2 Nos	-Do-
35	Steel rule 15 cm inch and metric	15cm	Pump Operator	1 No	-Do-
36	Straight edge gauge 4 ft.	4ft	Pump Operator	4 Nos	-Do-
37	Temperature gauge 0-100 deg c	0-100 deg C	Pump Operator	2 Nos	-Do-
38	Three cell torch		Pump Operator	2 Nos	-Do-
39	Torque wrenches 5-35Nm, 12-68Nm & 50-225 Nm	5-35 nm 12-68 nm 50- 225 nm	Pump Operator	2 Nos	-Do-
40	Trammel 30 cm	30cm	Pump Operator	1each	-Do-
41	Travelling and gantry cranes		Pump Operator	2 Nos	-Do-
42	Vice grip pliers		Pump Operator	1 No	-Do-
43	Volmeter AC to 500 V	500V	Pump Operator	2 Nos	-Do-
44	Wall hoists		Pump Operator	2 Nos	-Do-
45	Wire gauge(metric)	metric	Pump Operator	1 No	-Do-
46	Back pull out type centrifugal pump	suction flande dia 2.5 inches	Pump Operator	1 No	-Do-

47	Diesel engine 2 stroke vertical(up to 10kw/ISHP)	10KW/15HP	Pump Operator	1 No	-Do-
48	Diesel engine driven portable pump set	Diesel engine 2 stroke : -Type : Vertical - Power Rating : Up to 10 KW/15HP	Pump Operator	1 No	-Do-
49	Discrete component trainer/basic electronics trainer		Pump Operator	1 No	-Do-
50	Horizontal split casing pump (2inch Discharge)	2 inch discharge	Pump Operator	1 No	-Do-
51	Hydraulic leak testing equipment		Pump Operator	1 No	-Do-
52	Injector testing set(hand tester)		Pump Operator	1 No	-Do-
53	Overhead tank, pump, minimum 5000 litres with level indicators and piping layout	5000 lt.	Pump Operator	1 No	-Do-
54	Submersible pump set eight stage up to 10 kw/15hp	10KW/15hp	Pump Operator	1 No	-Do-
55	Internet connection with all accessories	UPS/ISP/Wi-Fi	Pump Operator	1 No	-Do-
56	Laser printer	company - HP	Pump Operator	1 No	-Do-

Instructor-I

Group Instructor-I

Group Instructor-II

S. No	Item Description / Specifications	Qty
1.	<p>Submersible Pump Set Training System Light weight, tabletop, Aluminum profile modular flat Control panel setup with CPVC /UPVC piping and fittings and Self explanatory process. USB based PC interface with graph plotting facility for different parameters such as pressure and flow etc should be provided. Lab view based software should be provided to display and monitor various parameters such as pressure, flow , voltage and current etc. Different Sensors should used in whole system such as Speed Sensors, output delivery measured in terms of flow in LPH & pressure in bar to determine the different parameters of pump. Control And Monitoring Panel should provide showing circuits diagrams & its connection for easy understanding and connection, 4 mm shrouded banana patch cords for shock proof connection etc.</p> <p>Technical Specification: Power (HP) : 1 HP Type of Product : Water Filled Submersible Pump Power (KW) : 0.75 KW Winding Material : Copper Electronic flow sensor , Pressure Sensor Suction pressure gauge and Discharge pressure gauge 4" dial size. ROTAMETER of 0-1000LPH, 1" size. CPVC/UPVC Piping with all fittings should be provided Sump tank capacity of 100 liter, plastic/PVC Accessories : Set of User manual and Connecting Cables</p> <p>List of Experiments : 1)To calculate efficiency of Submersible Pump 2)To analysis of change in pressure and flow of Submersible Pump 3)Study the working of Submersible Pump</p>	1
2.	<p>Centrifugal Pump (Back Pull Out & Multiple Stage type) Training System Aluminum profile (30 ×30) modular flat demo panel setup with SS (304/316) piping & wide angle view of every component in process. PC interface with graph plotting facility Thyristorised DC drive to set RPM for prime mover coupled to each pump. Trunnion mounted prime mover with speed torque sensors giving accurate shaft power & pump output delivery measured in terms of flow in LPH & pressure in bar to determine efficiency of pump.</p> <p>Technical Specifications: Computer Interface Panel : PC USB port using USB IO module through 25 pin D (M) connector on CIP & Type A to mini B cable consisting of 4 ADC channels i/p: 0 to 2.5V with 1 no. AI input simulation pot, 1 DAC channel O/P 2.5 V, V to I function block I/P 0 to 2.5V & O/P 0-20 or 4-20 mA (100E load) switch settable, I to V function block: I/P 4 to 20 mA & O/P 0-2.5V, DC V/I measurement panel. Facility of modbus to communicate AC multi parameter measurement meter (MMM)/Power Network analyzer. Software on CD: Virtual Workbench package is a USB / serial modbus based software working on windows dot Net platform coupled with USB IO module useful as general purpose utility which supports different control strategies like Single or multi loop PID controllers, Fuzzy controller, Graph plotting in XY, XT & polar mode etc, Modbus interface, Data logging, Event trigger, inbuilt Function generator etc</p>	1

	<p>Instrumentation Power Supply cum Digital Meter Panel •Power supply +12V, -12V, 500 mA, +5V/300mA, •Unregulated 17VDC /750 mA , DC motor field supply 220VDC, Line synchronizing signal, Multi channel digital display of torque & speed. DC Volt meter & DC Ammeter Panel •DC voltmeter 0-300VDC, DC ammeter 0-5A/10A, 4A/10A circuit breaker. SCR Actuator (variable DC) cum Sensor Signal conditioning Panel •Full bridge SCR based 0V-195V / 3 or 10 Amp cosine firing with linear characteristics. •Supports signal conditioning circuit for speed, torque in kg (output 0-2.5Vdc FS) •External control signal (0 - 2.5VDC). Centrifugal pump, Pump/type/capacity: 1HP/2800 RPM, Suction 1.25", Discharge 1.25", Shaft dia – 16mm, Foot mounted Prime mover /Capacity/ Frame mounting : DC integrated motor separate shunt, series & armature coils, 300W/ 1500RPM, Field: 180VDC, Armature: 180DC, 100 Frame, Chassis mounted with handle clamps to easy coupling two motors with 4 vibration mount with soft nylon coupler. Shaft dia 19mm. Electronic Sensor type/output/ range : Load cells 6 kg. 2 No. to measure torque, o/p 0-2.5V & speed sensor assembly to measure the speed o/p 0-2.5V. Pressure Gauge: Suction pressure gauge: Oil filled, 0-1 bar, 4" dial size, 0.5" port using reducer. Discharge Pressure Gauge: Oil filled, 0-1 bar, 4" dial size, 0.5" port using reducer. ROTAMETER: 0-1000LPH, 1" size. Piping material/size : SS tube: material SS304, 1" size, length 1 meter. Reinforce plastic pipe: 1" size, 3 meters. Ball valve: 1" size, SS 304. Sump tank capacity/ material :1 no. 50 liter, plastic/PVC List of Experiments : 1)To calculate efficiency of centrifugal pump 2)To calculate efficiency of single centrifugal pump test rig by using rotameter. 3)To calculate efficiency of 2 centrifugal pumps connected in series. 4)To calculate efficiency of 2 centrifugal pumps connected in parallel. Accessories: Set of Instructor Guide & Student Workbook.</p>	
3.	<p>Reciprocating Pump Training System Sturdy tabletop, Aluminum profile (30 ×30) modular flat demo panel setup with SS (304/316) piping & wide angle view of every component in process. PC Interface with graph plotting facility should be provided. Thyristorised DC drive is used to set RPM for prime mover coupled to each pump. Trunnion mounted prime mover with speed torque sensors giving accurate shaft power & pump output delivery measured in terms of flow in LPH & pressure in bar to determine efficiency of pump. Technical Specifications Computer Interface Panel : USB port using USB IO module through 25 pin D (M) connector on CIP & Type A to mini B cable consisting of 4 ADC channels i/p: 0 to 2.5V with 1 no. AI input simulation pot, 1 DAC channel O/P 2.5 V, V to I function block I/P 0 to 2.5V & O/P 0-20 or 4-20 mA (100E load) switch settable, I to V function block: I/P 4 to 20 mA & O/P 0-2.5V, DC V/I measurement panel using panel. facility of modbus to communicate AC multi parameter measurement meter (MMM)/Power Network analyzer. supplied in electrical machine trainer quoted above. Software on CD: Virtual Workbench package is a USB / serial modbus based software working on windows dot Net platform coupled with USB IO module useful as general purpose utility which supports different control strategies like Single or multi loop PID controllers, Fuzzy controller, Graph plotting in XY, XT & polar mode etc, Modbus interface, Data logging, Event trigger, inbuilt Function generator etc Instrumentation Power Supply cum Digital Meter Panel Power supply +12V, -12V, 500 mA, +5V/300mA,</p>	1

	<p>Unregulated 17VDC /750 mA , DC motor field supply 220VDC, Line synchronizing signal, Multi channel Digital Meter for digital display of torque & speed.</p> <p>DC Volt Meter & DC Ammeter Panel DC Voltmeter 0-300VDC, DC Ammeter 0-5A/10A, 4A/10A circuit breaker.</p> <p>SCR Actuator (variable DC) cum Sensor Signal conditioning Panel Full bridge SCR based 0V-195V / 3 or 10 Amp cosine firing with linear characteristics. Supports signal conditioning circuit for speed, torque in kg to give output 0-2.5Vdc (FS). External control signal (0 - 2.5VDC).</p> <p>Pump/type/capacity : Reciprocating pump, 0.5HP/1500 RPM, Suction 0.5", Discharge 0.5", Shaft dia – 20mm, Foot mounted</p> <p>Prime mover /Capacity/ Frame mounting: DC Shunt motor separately excited, 2HP/ 1500RPM, Field: 180VDC, Armature: 180DC, 112 Frame, Chassis mounted with handle clamps to easy coupling two motors with 4 vibration mount with soft nylon coupler. Shaft dia 24mm.</p> <p>Electronic Sensor type/output/ range: Load cells 6 kg. 2 No. to measure torque, o/p 0-2.5V & speed sensor assembly to measure the speed o/p 0-2.5V</p> <p>Pressure Gauge: Suction pressure gauge: Oil filled, 0-1 bar, 4" dial size, 0.5" port using reducer.</p> <p>Discharge Pressure Gauge: Oil filled, 0-2.5 bar, 4" dial size, 0.5" port using reducer.</p> <p>ROTAMETER : 0-1000LPH, 1" size with reducer to 0.5"</p> <p>Piping material/size : SS tube: material SS304, 0.5" size, length 0.7 meter.</p> <p>Reinforce plastic pipe: 0.5" size, 3 meters.</p> <p>Sump tank capacity/ material :1 no. 50 liter, plastic/PVC</p> <p>List of experiments :</p> <ol style="list-style-type: none"> 1)To calculate efficiency of reciprocating pump 2)To calculate efficiency of the Reciprocating pump test rig by using rotameter. <p>Accessories: Set of Instructor Guide & Student Workbook.</p>	
4.	<p>Three Phase AC Squirrel Cage Induction Motor with Star Delta Starter Training System</p> <p>The trainer should have Aluminum profile sturdy Modular flat panel (table top) system, carrying various high voltage components housed in plastic enclosures (panel) to minimize shock possibility</p> <p>Brake pulley arrangement for variable loading of motor</p> <p>Technical Specifications:</p> <p>A) Motor Specifications</p> <p>3 Phase Squirrel Cage Induction Motor : -</p> <p>Voltage: 415VAC, 50Hz, Capacity: 1HP/4 pole/ 1500RPM/12 terminals, Rotor construction: Diecast Squirrel cage rotor, Stator construction: 6X2 terminals brought out to run machine at two speeds using pole changing method (Dahellander winding)</p> <p>Frame/mounting: 100 frame, chassis mounted, 19mm shaft dia. Loading arrangement: Friction brake pulley (60.5mm dia) for loading arrangement with 20Kg spring balance for torque measurement. Speed Measurement: Using hand held tachometer.</p> <p>CONTROL PANEL ELECTRICAL SPECIFICATIONS</p> <p>It should consists of :</p> <p>Input 3 phase DOL Starter panel</p> <ul style="list-style-type: none"> • 4 pole MCB of 415 V/4A, DOL 9A Contactor with 230V / 50 Hz / 11VA Coil, Bimetallic thermal O/L relay with range 1.4A - 2.3A . • R-Y-B Input Indicators. <p>Integrated AC 3 Phase Multifunction Measurement Panel</p> <p>Bidirectional Multifunction</p> <ul style="list-style-type: none"> • 3 Phase ¾ wire, 415V, CT Input 5A , LCD/LED display, Aux supply 230V, 45-65 Hz, 5W • V,I , Hz, Pf, KVA, KW,KWH & Modbus RTU RS 485 <p>FWD-OFF-REV Switch Panel</p> <ul style="list-style-type: none"> • FWD/REV, 3 pole 3 way switch with centre OFF, 6A/440V. 	1

	<p>List of Experiments :</p> <ol style="list-style-type: none"> 1) Speed torque characteristics of 3 phase squirrel cage induction motor. 2) Efficiency, % slip & input power factor measurement of 3 phase squirrel cage induction motor. 3) Speed control of Squirrel Cage Induction motor by pole changing method. 4) 'No Load Test' & 'Blocked Rotor Test' on 3 Ph. squirrel cage induction motor. <p>• Accessories : 1) Hand held digital Tachometer, 3 Ph. / 3A variac 2) Set of Instructor Guide & Student Workbook.</p>	
5.	<p>AC Squirrel Cage Induction Motor Training System The trainer should have Aluminum profile sturdy Modular flat panel (table top) system, carrying various high voltage components housed in plastic enclosures (panel) to minimize shock possibility</p> <p>Single Phase 220V, 1 HP Capacitor driven type Break pulley arrangement for variable loading of motor should be provided.</p> <p>MOTOR SPECIFICATIONS Single Phase AC induction motor Voltage: 230VAC, 50Hz, Capacity: 1HP/4 pole/ 1500RPM/ 10 terminals, Rotor construction: Die cast squirrel cage Rotor, Stator construction: Two windings should be brought out on 4 terminals for main & auxiliary, these will be used to configure different motors split phase, CSCR, CSIR, Frame/mounting: 100 frame, chassis mounted, 19 mm shaft dia. Loading arrangement: Friction break pulley (60.5mm dia) for loading arrangement with 20Kg spring balance for torque measurement. Speed Measurement: Using hand held tachometer.</p> <p>CONTROL PANEL ELECTRICAL SPECIFICATIONS Single Phase Motor , Alternator & Sync Motor Panel</p> <ul style="list-style-type: none"> • 1 ph. MCBs of 4A/1.6A 1 each. • Bulb Load. <p>Integrated AC 1 Phase Multifunction Measurement Panel</p> <ul style="list-style-type: none"> • Should Consist of Digital meter for 1 Measures V, I, PF (0.2 lag - unity 0.2 lead), W, VA, VAR, Hz etc.) • Current specs for 1 meter = 5A, Auxiliary supply = 170-250VAC <p>Three Phase Wound Rotor & Sync. Motor Panel</p> <ul style="list-style-type: none"> • Rotor resistors of 30E/5A with 3 taps of 0E, 15E, 21E, 30E (each 3 nos.) • Rotor resistor selector switch, 3 pole 6 Way 6A/440 V. • DC Rotor excitation over current Circuit Breaker (3Amp) <p>List of experiments should cover as under :</p> <ol style="list-style-type: none"> 1) Study of Speed-Torque Characteristics of 1 Phase induction motor (Split phase type). 2) Study of Efficiency & Input power factor of 1 Phase induction motor (Split phase type) for various loading conditions. 3) Study of Speed-Torque Characteristics of 1 Phase Induction Motor (Capacitor Start Type) 4) Study of Efficiency & Input Power factor of 1 Phase induction motor (Capacitor Start Type) for various loading conditions. 5) Study of Speed -Torque Characteristics of 1 Phase Induction Motor (Capacitor Start-Run Type). 6) Study of Efficiency & Input power factor of 1 Phase induction motor (Capacitor Start-Run Type) for various loading conditions. 7) Study <i>NO LOAD TEST & BLOCKED ROTOR TEST</i> on 1 Phase induction motor. <p>• Accessories : 1) Set of Instructor Guide & Student Workbook.</p>	1