## INDIAN MARITIME UNIVERSITY KOLKATA CAMPUS

No. IMU-KC/Laboratory Equipment/16-17

## <u>Sub: Quotation for procurement of Instruments for Electrical Machine</u> <u>Laboratory at IMU-Kolkata Campus</u>

Date: 17.02.2017

Sealed quotations are invited towards procurement of Instruments for Electrical Machine Laboratory at IMU-KC under two bid systems i.e. Technical Bid and Financial Bid. The details of the instruments are as follows:

Sl.	Items	Specifications	Qty	Unit
No.		-	_	
01	Different method of starting of 3 phase squirrel cage Induction motor & their comparison [D.O.L, Auto transformer & Star Delta]	Ino 2 HP, 3-phase, 415V, 50Hz, 1500 rpm, 4-pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3A AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont; Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top 1 no AUTO TRANSFORMER TYPE Starter. 1 no STAR-DELTA Starter. 1 no Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial). 1 no Digital Ammeter Panel type (0-5amp) (MIA) (4" x 4" or 4" x 2" dial). 1 no Analog type AC ammeter (0-10amp) (MIA) (4" x 4" or 4" x 2" dial). Digital noncontact type tachometer. (Range 0-9999 RPM); Fuse protection; Overload protection Off on switch and power plug; All terminals & electrical instruments are to be available on the Bakelite panel board.	01	Set
02	Speed control of 3 phase squirrel cage induction motor by different methods & their	1no 1 HP, 3-phase, 415V, 50Hz, 1500 rpm, 4-pole and 2-pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 1HP; Voltage: 415±10% V AC; Current: 2.1A AC; Speed: 1425 RPM and 2800 RPM; Frequency: 50 C/S; Frame: 80; Rating: Cont; Ins. CL. B; Phase: 3	01	Set

	comparison [voltage /frequency control]	Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top 1 no V/F controller 1 no Digital Voltmeter Panel type (0-500v)  (MIV) (4" x 4" or 4" x 2" dial). 1 no Digital Ammeter Panel type (0-10amp)  (MIA) (4" x 4" or 4" x 2" dial).  Digital noncontact type tachometer. (Range 0-9999 RPM); Fuse protection; Overload protection  Off on switch and power plug. All terminals & electrical instruments are to be available		
03	Determination of regulation of Synchronous machine by Synchronous Impedance & Potier reactance method.	on the Bakelite panel board.  DC SHUNT MOTOR Power: 2HP; Frame Size: 132 Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC; Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63; Brgs D.E.: 6205; Brgs N.D.E.: 6204 AC ALTERNATOR Power: 1KVA; Supply Voltage: 415V AC P.F.: 0.8; Current: 2.0A AC; Field/Exc. Voltage: 180V DC; Field/Exc. Current: 0.8A DC; Speed: 1500 RPM Duty: S1; Encl.: IP-21; Ins. CL.: F; Brgs D.E.: 6206 Brgs N.D.E.: 6205 Both the machines are flexibly coupled and mounted on sturdy M.s. channel base. The terminals of armature and shunt/series field windings of both the machines are brought over to Bakelite plate fixed on C.I. terminal box fitted on top of machine. Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top 2no Digital Voltmeter Panel type (0-300v) (MCV) (4" x 4" or 4" x 2" dial). 1no Digital Ammeter Panel type (0-1amp) (MCA) (4" x 4" or 4" x 2" dial).	01	Set

Ino Digital Ammeter Panel type (0-10amp) (MCA) (4" x 4" or 4" x 2" dial).  3no Digital Ammeter Panel type (0-10amp) (MIA) (4" x 4" or 4" x 2" dial).  Ino Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial).  Ino Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial).  Thyristor control Dc drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Flectrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  04 Determination the Bakelite panel board.  05 Exployed Squirrel Cage Induction motor and to find out the full load slip.  06 Squirrel Cage Induction motor AC INDUCTION MOTOR  Power: 2HP, Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1450 RPM; Frequency: 50 C/S; Frame: 80  Rating: Cont Ins. CL. B; Phase: 3  DC SEPARATELY EXCITED  GENERATOR  Power: 2HP, Frame Size: 132; Armature  Voltage: 220V DC; Field/Exc. Ourrent: 8.3A  DC; Field/Exc. Ourrent: 0.88A DC  Speed: 1500 RPM; Duty: S1  Encl.: IP-21; Ins. CL.: B; Commutators  Segment: 63  Brgs D.E.: 6205; Brgs N.D.E.: 6204  Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet,  Powder coating. I. P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4"					
Sano Digital Ammeter Panel type (0-10amp) (MIA) (4" x 4" or 4" x 2" dial).     Ino Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial).     Thyristor control De drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field.					
(MIA) (4" x 4" or 4" x 2" dial). Ino Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial). Thyristor control De drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  04 Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  05 AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SFPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC Sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).			(MCA) (4" x 4" or 4" x 2" dial).		
(MIA) (4" x 4" or 4" x 2" dial). Ino Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial). Thyristor control De drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  04 Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  05 AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SFPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC Sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).			3no Digital Ammeter Panel type (0-10amp)		
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(MIV) (4" x 4" or 4" x 2" dial). Thyristor control Dc drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  O4 Determination the Bakelite panel board.  O4 Determination the Bakelite panel board.  O5 EPARATELY EXOTED TO					
Thyristor control De drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  104 Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  105 Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500V)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Mammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Mammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino					
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compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  O4 Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  O5 Separate 12 Excutted General September 12 Current 3.3 AC; Speed: 1425 RPM; Frequency; 50 C/S; Frame: 80 Frequency; 50 C/S; F					
speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-pole Squirrel Cage Induction motor Ac INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exe. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-50MA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino three phase Variable AC source, Ino Voltmeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). 3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type					
source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4- pole Squirrel Cage Induction motor and to find out the full load slip.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4- pole Squirrel Cage Induction motor and to find out the full load slip.  3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Field/Exc. Voltage: 220V DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500V)(MIV), (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Mammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type			l •		
Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  104 Determination the Electrical instruments are to be available on the Bakelite panel board.  105 Jeff. 3-phase, 400v, 50Hz, 1500 rpm, 4-pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80  105 Rating: Cont Ins. CL. B; Phase: 3  106 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A  107 DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC  108 Speed: 1500 RPM; Duty: S1  109 Encl.: IP-21; Ins. CL.: B; Commutators  109 Segment: 63  100 Brgs D.E.: 6205; Brgs N.D.E.: 6204  100 Rubber mat for reducing vibration of above system.  100 Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  100 (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial).  110 Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial).  110 No Wattmeter, (4" x 4" or 4" x 2" dial).  111 No Wattmeter, (4" x 4" or 4" x 2" dial).  111 No Wattmeter, (4" x 4" or 4" x 2" dial).  112 No Homester (10)(MCA), (4" x 4" or 4" x 2" dial).  113 A-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type					
with minimum 3 steps variation capability. Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  04 Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  DC SEPARATELY EXCITED GENERATOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Raing: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: P-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC shect, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement with water-pulley and two spring balance one. Ino Voltmeter(0- 500V)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). J-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type					
Fuse protection. Overload protection. Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4- pole Squirrel Cage Induction motor AC INDUCTION MOTOR Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exe. Voltage: 220V DC; Field/Exe. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0- 500v)(MIV), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Jen Ammeter(0-10)(MCA), (4" x 4" or 4"					
Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4- pole Squirrel Cage Induction motor and to find out the full load slip.  Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500V)(MIV), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).					
noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-pole Squirrel Cage Induction motor and to find out the full load slip.  Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame: Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exe. Voltage: 220V DC; Field/Exe. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino A					
RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.  Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  Reflective and to Separate and Separate					
instruments are to be available on the Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4- pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance arrangement one. Ino Voltmeter(0- 500v)(MIV), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Ammeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).			_ · · · · · · · · · · · · · · · · · · ·		
Bakelite panel board.  2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4- pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0- 500v)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). 3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type					
Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.  Description of the full load slip					
the Slip Torque characteristics of an Induction motor and to find out the full load slip.  Dewer: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500V)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). 3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type			*	0.1	
Slip Torque characteristics of an Induction motor and to find out the full load slip.  AC INDUCTION MOTOR  Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80  Rating: Cont Ins. CL. B; Phase: 3  DC SEPARATELY EXCITED  GENERATOR  Power: 2HP; Frame Size: 132; Armature  Voltage: 220V DC; Armature Current: 8.3A  DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC  Speed: 1500 RPM; Duty: S1  Encl.: IP-21; Ins. CL.: B; Commutators  Segment: 63  Brgs D.E.: 6205; Brgs N.D.E.: 6204  Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Wattmeter, (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).  3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type	04			01	Set
characteristics of an Induction motor and to find out the full load slip.  Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Voltmeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial).					
an Induction motor and to find out the full load slip.  Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial).  1no Ammeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). 1no Wattmeter, (4" x 4" or 4" x 2" dial). 1no three phase Variable AC source, 1no Voltmeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). 1no Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). 3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type					
motor and to find out the full load slip.  Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0- 500v)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wottmeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). 3-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type			l — — — — — — — — — — — — — — — — — — —		
find out the full load slip.  Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0- 500v)(MIV), (4" x 4" or 4" x 2" dial). InoAmmeter(0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Wattmeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter(0-10)(MCA), (4" x 4" or 4" x 2" dial). Ja-phase off-on switch; digital tacho-meter Fuse protection; Electrical resistive type		an Induction			
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Loading arrangements for DC generator;					

Power plug; All terminals are to be available on the panel board; Instruction Manual All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" x 2" dial).		T		ı	1
available on the panel board; Instruction Manual All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  To make connection diagram of full pitch & fractional slot winding of 18 slot squirrel cage Induction motor for 2 pole & 4 pole operation.  Prequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0- 500\/\(\text{MIN}\), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  To Alternator: IKVA/415V/50Hz/1500 rpm Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms, Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)			Overload protection		
Manual All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  105 To make connection diagram of full pitch & fractional slot winding of 18 slot squirrel cage Induction motor for 2 pole & 4 pole and 2-pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 1HP; Voltage: 415±10% V AC Current: 2.1A AC; Speed: 1425 RPM and 2800 RPM Frequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0- 500v)(MIV), (4"x4" or 4" x 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" x 2" dial). Ino three phase Variable AC source; 3-phase off-on-switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" x 2" dial).  2 No. Alternator: IKVA/415V/50Hz/1500 rpm Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-500V 2 nos MI Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  To make connection diagram of full pitch & fractional slot winding of 18 slot squirrel cage Induction motor for 2 pole & 4 pole operation.  Prequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  Parallel operation of three phase alternator.  Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)			I -		
CABES ELECTRA make (4"x4" or 4" X 2" dial).  Ino 1 HP, 3-phase, 415V, 50Hz, 1500 rpm, 4-pole and 2-pole Squirrel Cage Induction motor motor MC INDUCTION MOTOR Power: 1HP; Voltage: 415±10% V AC Current: 2.1 A AC; Speed: 1425 RPM and 2800 RPM Frequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500V)(MIV), (4"x4" or 4" X 2" dial). Ino Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on-switch, digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" x 2" dial).  Of Parallel operation of three phase alternator.  Of Parallel 2 No. DC Shunt Motor: 2 hp/220V/1500 rpm Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos MI Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos MI Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
Discription   Discription					
To make connection diagram of full pitch & fractional slot winding of 18 slot squirrel cage Induction motor AC INDUCTION MOTOR Power: HP; Voltage: 415±10% V AC Current: 2.1A AC; Speed: 1425 RPM and 2800 RPM Frequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). Ino Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino here phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).    O6   Parallel operation of three phase alternator.   2 No. Alternator: IkVA/415V/50Hz/1500 rpm 2 No. DC Shunt Motor: 2 hp/220V/1500 rpm Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following:			· ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `		
connection diagram of full pitch & fractional slot winding of 18 slot squirrel age Induction motor for 2 pole & 4 pole operation.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, 1.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. 1 no Voltmeter(0- 500v)(MIV), (4"x4" or 4" X 2" dial). 1 no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). 1 no three phase Variable AC source; 3-phase off-on switch, digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  O6 Parallel operation of three phase alternator.  O7  Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. For ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-500V 2 nos MC ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rhoostat 1 A. 500 Ohns. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)			,		
diagram of full pitch & fractional slot winding of 18 slot squirrel cage Induction motor for 2 pole & 4 pole operation.  Prequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, 1.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). Ino Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial). Ino Alternator: 1kVA/415V/50Hz/1500 rpm  Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)	05		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	01	Set
pitch & fractional slot winding of 18 slot squirrel cage Induction motor for 2 pole & 4 pole operation.  Panel Box (48 inch x 24 inch x 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" x 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" x 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" x 2" dial). I no here phase variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" x 2" dial).  Parallel operation of three phase alternator.  Panel board for the experiment consists of M. S. Channel, Bakclite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MI Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Requency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
fractional slot winding of 18 slot squirred cage Induction motor for 2 pole & 4 pole operation.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  O6 Parallel operation of three phase alternator.  O7 Parallel operation of three phase alternator. Backlite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)		· ·			
winding of 18 slot squirrel cage Induction motor for 2 pole & 4 pole operation.  Frequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no horize phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  Parallel operation of three phase alternator.  Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light.  FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
slot squirrel cage Induction motor for 2 pole & 4 pole operation.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). 1 no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). 1 no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). 1 no here phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  O6 Parallel operation of three phase alternator.  O7 Parallel operation of three phase alternator.  O8 Parallel operation of three phase alternator.  O8 Possible of the experiment consists of M. S. Channel, Bakelite board. It includes the following:  For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light.  FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
Induction motor for 2 pole & 4 pole operation.  Frequency: 50 C/S; Frame: 80; Rating: Cont Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no harmeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  O6 Parallel operation of three phase alternator.  O7 Description of three phase alternator.  D8 Description of three phase alternator.  O8 Description of three phase alternator and for the experiment consists of M. S. Channel, Bakelite board. It includes the following:  For DC MOTOR AS PRIME MOVER  2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light.  FOR ALTERNATOR  2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Frequency meter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)		_			
for 2 pole & 4 pole operation.  Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  Of Parallel operation of three phase alternator.  Of three phase alternator: IKVA/415V/50Hz/1500 ppm Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following: For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light. FOR ALTERNATOR 2 nos M Voltmeter 96 x 96 mm digital panel mounted 0-500V 2 nos MI Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
pole operation.  Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  Of Parallel operation of three phase alternator:  It includes the following:  For DC MOTOR AS PRIME MOVER  2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light.  FOR ALTERNATOR  2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)					
system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Ino Voltmeter(0-500v)(MIV), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). I no Ammeter(0-5)(MIA), (4"x4" or 4" X 2" dial). Ino three phase Variable AC source; 3-phase off-on switch; digital tacho-meter; Fuse protection; Overload protection; Power pluge. All terminals are to be available on the panel board. All meters (Digital Panel type) are of CABES ELECTRA make (4"x4" or 4" X 2" dial).  Of Parallel operation of three phase alternator.  Of Parallel 2 No. Alternator: IKVA/415V/50Hz/1500 rpm Panel board for the experiment consists of M. S. Channel, Bakelite board. It includes the following:  For DC MOTOR AS PRIME MOVER 2 nos MC Voltmeter 96 x 96 mm digital panel mounted 0-300V. 2 nos MC Ammeter 96 x 96 mm digital panel mounted 0-10 A. DC speed regulator and controller Indicating light.  FOR ALTERNATOR 2 nos MI Voltmeter 96 x 96 mm digital panel mounted 0-500V 2 nos MI Ammeter 96 x 96 mm digital panel mounted 0-10 A. 2 nos Rheostat 1 A. 500 Ohms. Indicating light Motor Alternator coupled with separately in a common base plate (2 sets Coupling arrangement 2 set)		*			
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Provision of A.C. /D.C. novvor supply					
			• Provision of A.C. / D.C. power supply		
(what ever is needed)					
ACCESSORIES			ACCESSORIES		

		Tachometer and provision for speed		
		measurement		
		• Fuse protection		
		Off on switch and power plug		
		Over speed trip		
		Phase failure relay		
		Adjustable reverse current relay		
		• Panel board for the experiment consists of		
		M. S. Channel, Bakelite board (6mm)		
		• All terminals are to be available on the		
		panel board.		
		• 3 nos Change Over Switch for parallel		
		operation (manual type)		
		• 3 nos Change Over Switch for parallel		
		operation (Push button operated ACB		
		TYPE)		
		• 2 nos Variable DC Source for motor		
		• 2 nos Single Phase Variac for alternator		
		field.		
		• 6 sets 10 w Lamp for lamp method		
		synchronization		
		• 4 nos 50A Copper BUS-BAR.		
		• 1no Frequency Meter with change over		
		switch		
		• 1 no Synchroscope meter with (PT) for		
		synchronization method.		
		• 1 no 0-500V ac meter analog type for		
		synchronization method.		
		• All terminals are to be available on the		
		panel board		
		• All meters (Digital Panel type) are of		
		CABES ELECTRA make (4"x4" or 4" X 2"		
		dial).		
07	Cut Section of 3	2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-	01	Set
	phase squirrel	pole Squirrel Cage Induction motor.		each
1	cage induction	Alternator: 1KVA/415V/50Hz/1500 rpm		
	cage induction motor and	Alternator: 1KVA/415V/50Hz/1500 rpm		

#### **Terms & conditions:**

- (i) The tender is for all the items i.e. 01to 07. A bidder may quote for individual item or all the items in the tender. Each item will be considered on the basis of L1 price for that item.
- (ii) The Bid submitted will be evaluated based on the details of technical qualification submitted by the bidder under Cover I in the prescribed formats to ascertain whether the bidders qualify. The Cover II (Price Bid) of only those firms who technically qualify as per the documents in Cover I will be opened. The format for Technical Bid is given in Annexure-I, while price bid format in given in Annexure-II
- (iii) The Cover I shall be addressed to "The Director, Indian Maritime University Kolkata Campus" and should be duly superscribed as "Cover-I-Technical Bid for procurement of Instruments for Electrical Machine Laboratory at IMU-KC" and sealed properly. Name and Address of the bidder shall also be written/ printed on the cover.

(iii) The Cover II shall be addressed to "The Director, Indian Maritime University – Kolkata Campus" and should be duly super scribed as "Cover-II-Price Bid for procurement of Instruments for Electrical Machine Laboratory at IMU-KC" and sealed properly. Name and Address of the bidder shall also be written/printed on the cover.

#### (iv) Main Cover

Both the "Cover I" and "Cover II" shall be placed inside the main cover, which shall be a addressed to "The Director, Indian Maritime University – Kolkata Campus P-19, Taratala Road, Kolkata: 700088, West Bengal, India" and the main cover should be duly superscribed as "Tender for procurement of Instruments for Electrical Machine Laboratory at IMU-KC" and sealed properly.

- (iv) The rates quoted should be comprehensive and inclusive of all taxes, delivery charges, installation, commissioning and trail run.
- (v) Last date of submission of quotation is 10.03.2017.
- (vi) The Equipment should be delivered and installed within the period of 4 weeks from the date of issue of Purchase Order. If the bidder fails to deliver and place any or all the Equipments or perform the service by the specified date, penalty at the rate of 1% per week of the total order value subject to the maximum of 10% of total order value will be deducted.
- (vii) Delivery of the above items should be made at IMU Kolkata Campus at P-19, Taratala Road, Kolkata 700 088.
- (viii) Rates quoted should be valid for a period of 2 months from the last date of submission of the bids. Other than the increase in taxes imposed by statutory authority, no change in the rate is acceptable during the period.
- (ix) Conditional bids will not be accepted.
- (x) 100% Payment will be made through Bank Transfer after successful installation, delivery and trial run of the equipments.
- (xi) Minimum 3 years free service warranty should be given for the equipment/equipments. Calls should be attended within 24 hrs. in case of any break down.

Sd/-

O.I.C. - Purchase

To

The Director

Indian Maritime University – Kolkata Campus

P-19 Taratala Road, Kolkata – 7000 88

Dear Sir,

Having agreed to the terms and condition of the tender, we hereby submit our Technical Bid for "Procurement of Instruments for Electrical Machine Laboratory at IMU-KC" as detailed below

### Format of Technical Bid

Annexure - I

**Procurement of Instruments for Electrical Machine Laboratory at IMU-KC** 

Sl.		Specifications		Unit	
	Items	Specifications	Qty	Unit	Compliance
No.					
01	Different	1no 2 HP, 3-phase, 415V, 50Hz, 1500 rpm,	01	Set	
	method of	4-pole Squirrel Cage Induction motor			
	starting of 3	AC INDUCTION MOTOR			
	phase squirrel	Power: 2HP; Voltage: 415±10% V AC;			
	cage Induction	Current: 3.3A AC; Speed: 1425 RPM;			
	motor & their	Frequency: 50 C/S; Frame: 80			
	comparison	Rating: Cont; Ins. CL. B; Phase: 3			
	[D.O.L, Auto	Rubber mat for reducing vibration of above			
	transformer &	system.			
	Star Delta]	Panel Box (48 inch X 24 inch X 8 inch) as			
		per required of 18 gauge CRC sheet,			
		Powder coating, I.P. Protection, Neoprene			
		rubber gasket, Colour- of white. Panel made			
		of two back door & locking arrangements			
		with table top self stand type.			
		(48 inch X 24 inch X 30 inch) wooden table			
		for panel mountain top			
		1 no AUTO TRANSFORMER TYPE			
		Starter.			
		1 no STAR-DELTA Starter.			
		1no Digital Voltmeter Panel type (0-500v)			
		(MIV) (4" x 4" or 4" x 2" dial).			
		1no Digital Ammeter Panel type (0-5amp)			
		(MIA) (4" x 4" or 4" x 2" dial).			
		1no Analog type AC ammeter (0-10amp)			
		(MIA) (4" x 4" or 4" x 2" dial).			
		Digital noncontact type tachometer. (Range			
		0-9999 RPM); Fuse protection; Overload			
		protection			
		Off on switch and power plug; All terminals			
		& electrical instruments are to be available			
		on the Bakelite panel board.			
02	Speed control of	1no 1 HP, 3-phase, 415V, 50Hz, 1500 rpm,	01	Set	
	3	4-pole and 2-pole Squirrel Cage Induction			
	phase squirrel	motor			
	cage	AC INDUCTION MOTOR			
	induction motor	Power: 1HP; Voltage: 415±10% V AC;			
	by	Current: 2.1A AC; Speed: 1425 RPM and			
	different	2800 RPM; Frequency: 50 C/S; Frame: 80;			
	methods & their	Rating: Cont; Ins. CL. B; Phase: 3			

	comparison [voltage /frequency control]	Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type.  (48 inch X 24 inch X 30 inch) wooden table for panel mountain top 1 no V/F controller 1no Digital Voltmeter Panel type (0-500v)  (MIV) (4" x 4" or 4" x 2" dial). 1no Digital Ammeter Panel type (0-10amp)  (MIA) (4" x 4" or 4" x 2" dial). Digital noncontact type tachometer. (Range 0-9999 RPM); Fuse protection; Overload protection Off on switch and power plug. All terminals & electrical instruments are to be available			
03	Determination of regulation of Synchronous machine by Synchronous Impedance & Potier reactance method.	on the Bakelite panel board.  DC SHUNT MOTOR Power: 2HP; Frame Size: 132 Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC; Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63; Brgs D.E.: 6205; Brgs N.D.E.: 6204 AC ALTERNATOR Power: 1KVA; Supply Voltage: 415V AC P.F.: 0.8; Current: 2.0A AC; Field/Exc. Voltage: 180V DC; Field/Exc. Current: 0.8A DC; Speed: 1500 RPM Duty: S1; Encl.: IP-21; Ins. CL.: F; Brgs D.E.: 6206 Brgs N.D.E.: 6205 Both the machines are flexibly coupled and mounted on sturdy M.s. channel base. The terminals of armature and shunt/series field windings of both the machines are brought over to Bakelite plate fixed on C.I. terminal box fitted on top of machine. Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top 2no Digital Voltmeter Panel type (0-300v) (MCV) (4" x 4" or 4" x 2" dial). 1no Digital Ammeter Panel type (0-1amp) (MCA) (4" x 4" or 4" x 2" dial).	01	Set	

	T	1	1	T
	Ino Digital Ammeter Panel type (0-10amp) (MCA) (4" x 4" or 4" x 2" dial).  3no Digital Ammeter Panel type (0-10amp) (MIA) (4" x 4" or 4" x 2" dial).  1no Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial).  Thyristor control Dc drive (Armature variable voltage, current adjustable, IR compensation, Minimum and maximum speed limits, Field open trip), Variable DC source for both motor and Alternator field. Electrical inductive loading arrangement with minimum 3 steps variation capability. Fuse protection. Overload protection.  Off on switch and power plug. Digital noncontact type tachometer. (Range 0-9999 RPM). All terminals & electrical instruments are to be available on the Bakelite panel board.			
Determination the Slip Torque characteristics of an Induction motor and to find out the full load slip.	2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3 AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont Ins. CL. B; Phase: 3 DC SEPARATELY EXCITED GENERATOR Power: 2HP; Frame Size: 132; Armature Voltage: 220V DC; Armature Current: 8.3A DC; Field/Exc. Voltage: 220V DC; Field/Exc. Current: 0.88A DC Speed: 1500 RPM; Duty: S1 Encl.: IP-21; Ins. CL.: B; Commutators Segment: 63 Brgs D.E.: 6205; Brgs N.D.E.: 6204 Rubber mat for reducing vibration of above system.  Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top. Spring balance arrangement with water-pulley and two spring balance one. Base plate and coupling arrangement one. Ino Voltmeter(0-500v)(MIV), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-5)(MIA), (4" x 4" or 4" x 2" dial). Ino Wattmeter, (4" x 4" or 4" x 2" dial). Ino Hree phase Variable AC source, Ino Voltmeter(0-300v)(MVC), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial). Ino Ammeter (0-10)(MCA), (4" x 4" or 4" x 2" dial).	01	Set	

				ı	T
		Overload protection			
		Power plug; All terminals are to be			
		available on the panel board; Instruction			
		Manual			
		All meters (Digital Panel type) are of			
		CABES ELECTRA make (4"x4" or 4" X 2"			
		dial).			
05	To make	1no 1 HP, 3-phase, 415V, 50Hz, 1500 rpm,	01	Set	
0.5	connection	4-pole and 2-pole Squirrel Cage Induction	01	500	
	diagram of full	motor			
		AC INDUCTION MOTOR			
	pitch &				
	fractional slot	Power: 1HP; Voltage: 415±10% V AC			
	winding of 18	Current: 2.1A AC; Speed: 1425 RPM and			
	slot squirrel cage	2800 RPM			
	Induction motor	Frequency: 50 C/S; Frame: 80; Rating: Cont			
	for 2 pole & 4	Ins. CL. B; Phase: 3			
	pole operation.	Rubber mat for reducing vibration of above			
		system.			
		Panel Box (48 inch X 24 inch X 8 inch) as			
		per required of 18 gauge CRC sheet,			
		Powder coating, I.P. Protection, Neoprene			
		rubber gasket, Colour- of white. Panel made			
		of two back door & locking arrangements			
		1			
		with table top self stand type.			
		(48 inch X 24 inch X 30 inch) wooden table			
		for panel mountain top. 1no Voltmeter(0-			
		500v)(MIV), (4"x4" or 4" X 2" dial). 1 no			
		Ammeter(0-5)(MIA), (4"x4" or 4" X 2"			
		dial). 1no three phase Variable AC source;			
		3-phase off-on switch; digital tacho-meter;			
		Fuse protection; Overload protection; Power			
		pluge. All terminals are to be available on			
		the panel board. All meters (Digital Panel			
		type) are of CABES ELECTRA make			
		(4"x4" or 4" X 2" dial).			
06	Parallel	2 No. Alternator: 1KVA/415V/50Hz/1500	01	Set	
	operation of		``		
	_	rpm 2 No. DC Shunt Motor: 2 hp/220V/1500			
	three phase	_			
	alternator.	rpm			
		Panel board for the experiment consists of			
		M. S. Channel, Bakelite board.			
		It includes the following:			
		For DC MOTOR AS PRIME MOVER			
		2 nos MC Voltmeter 96 x 96 mm digital			
		panel mounted 0-300V. 2 nos MC Ammeter			
		96 x 96 mm digital panel mounted 0-10 A.			
		DC speed regulator and controller		1	
		Indicating light.			
		FOR ALTERNATOR			
		2 nos MI Voltmeter 96 x 96 mm digital			
		panel mounted 0-500V 2 nos MI			
		Ammeter 96 x 96 mm digital panel mounted			
		0-10 A. 2 nos Frequency meter 96 x 96 mm			
		digital panel mounted 0-10 A. 2 nos			
		Rheostat 1 A. 500 Ohms. Indicating light			
		Motor Alternator coupled with separately in		1	
		a common base plate (2 sets Coupling			
		arrangement 2 set)			
		• Provision of A.C. / D.C. power supply			
		(what ever is needed)			
		ACCESSORIES			
	i	i			i

		Tachometer and provision for speed			
		measurement			
		Fuse protection			
		Off on switch and power plug			
		Over speed trip			
		Phase failure relay			
		Adjustable reverse current relay			
		• Panel board for the experiment consists of			
		M. S. Channel, Bakelite board (6mm)			
		• All terminals are to be available on the			
		panel board.			
		• 3 nos Change Over Switch for parallel			
		operation (manual type)			
		• 3 nos Change Over Switch for parallel			
		operation (Push button operated ACB			
		TYPE)			
		• 2 nos Variable DC Source for motor			
		• 2 nos Single Phase Variac for alternator			
		field.			
		• 6 sets 10 w Lamp for lamp method			
		synchronization			
		• 4 nos 50A Copper BUS-BAR.			
		• 1no Frequency Meter with change over			
		switch			
		• 1 no Synchroscope meter with (PT) for			
		synchronization method.			
		• 1 no 0-500V ac meter analog type for			
		synchronization method.			
		All terminals are to be available on the			
		panel board			
		• All meters (Digital Panel type) are of			
		CABES ELECTRA make (4"x4" or 4" X 2"			
		dial).			
07	Cut Section of 3	2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-	01	Set	
	phase squirrel	pole Squirrel Cage Induction motor.		each	
	cage induction	Alternator: 1KVA/415V/50Hz/1500 rpm			
	motor and				
	Alternator.				

Yours faithfully,

Date

Place: Signature with Seal of Authorized Signatory

To

The Director

Indian Maritime University – Kolkata Campus

P-19 Taratala Road, Kolkata – 7000 88

Dear Sir,

Having agreed to the terms and condition of the tender, we hereby submit our Financial Bid for "Procurement of Instruments for Electrical Machine Laboratory at IMU-KC" as detailed below

# Format of Price Bid Procurement of Instruments for Electrical Machine Laboratory at IMU-KC

S1.	Items	Specifications	Qty	Unit	Price
No.	1001115	Specifications	20		(Rs.)
01	Different method of starting of 3 phase squirrel cage Induction motor & their comparison [D.O.L, Auto transformer & Star Delta]	Ino 2 HP, 3-phase, 415V, 50Hz, 1500 rpm, 4-pole Squirrel Cage Induction motor AC INDUCTION MOTOR Power: 2HP; Voltage: 415±10% V AC; Current: 3.3A AC; Speed: 1425 RPM; Frequency: 50 C/S; Frame: 80 Rating: Cont; Ins. CL. B; Phase: 3 Rubber mat for reducing vibration of above system. Panel Box (48 inch X 24 inch X 8 inch) as per required of 18 gauge CRC sheet, Powder coating, I.P. Protection, Neoprene rubber gasket, Colour- of white. Panel made of two back door & locking arrangements with table top self stand type. (48 inch X 24 inch X 30 inch) wooden table for panel mountain top 1 no AUTO TRANSFORMER TYPE Starter. 1 no STAR-DELTA Starter. 1 no Digital Voltmeter Panel type (0-500v) (MIV) (4" x 4" or 4" x 2" dial). 1 no Digital Ammeter Panel type (0-5amp) (MIA) (4" x 4" or 4" x 2" dial). 1 lno Analog type AC ammeter (0-10amp) (MIA) (4" x 4" or 4" x 2" dial). Digital noncontact type tachometer. (Range 0-9999 RPM); Fuse protection; Overload protection Off on switch and power plug; All terminals & electrical instruments are to be available on the Bakelite panel board.	01	Set	
02	Speed control of 3	1no 1 HP, 3-phase, 415V, 50Hz, 1500 rpm, 4-pole and 2-pole Squirrel Cage Induction	01	Set	
	phase squirrel	motor			
	cage	AC INDUCTION MOTOR			
	induction motor	Power: 1HP; Voltage: 415±10% V AC;			

		<del>,</del>		,	
	by	Current: 2.1A AC; Speed: 1425 RPM and			
	different	2800 RPM; Frequency: 50 C/S; Frame: 80;			
	methods & their	Rating: Cont; Ins. CL. B; Phase: 3			
	comparison	Rubber mat for reducing vibration of above			
	[voltage	system.			
	/frequency	Panel Box (48 inch X 24 inch X 8 inch) as			
	control]	per required of 18 gauge CRC sheet,			
		Powder			
		coating, I.P. Protection, Neoprene rubber			
		gasket, Colour- of white. Panel made of two			
		back door & locking arrangements with			
		table top self stand type.			
		(48 inch X 24 inch X 30 inch) wooden table			
		for panel mountain top			
		1 no V/F controller			
		1no Digital Voltmeter Panel type (0-500v)			
		(MIV) (4" x 4" or 4" x 2" dial).			
		1no Digital Ammeter Panel type (0-10amp)			
		(MIA) (4" x 4" or 4" x 2" dial).			
		Digital noncontact type tachometer. (Range			
		0-9999 RPM); Fuse protection; Overload			
		protection			
		Off on switch and power plug. All terminals			
		& electrical instruments are to be available			
		on the Bakelite panel board.			
		-			
03	Determination	DC SHUNT MOTOR	01	Set	
	of	Power: 2HP; Frame Size: 132			
	regulation of	Armature Voltage: 220V DC; Armature			
	Synchronous	Current: 8.3A DC; Field/Exc. Voltage:			
	machine by	220V DC; Field/Exc. Current: 0.88A DC;			
	Synchronous	Speed: 1500 RPM; Duty: S1			
	Impedance &	Encl.: IP-21; Ins. CL.: B; Commutators			
	Potier	Segment: 63; Brgs D.E.: 6205; Brgs N.D.E.:			
	reactance	6204			
	method.	AC ALTERNATOR			
		Power: 1KVA; Supply Voltage: 415V AC			
		P.F.: 0.8; Current: 2.0A AC; Field/Exc.			
		Voltage: 180V DC; Field/Exc. Current:			
		0.8A DC; Speed: 1500 RPM			
		Duty: S1; Encl.: IP-21; Ins. CL.: F; Brgs			
		D.E.: 6206			
		Brgs N.D.E.: 6205			
		Both the machines are flexibly coupled and			
		mounted on sturdy M.s. channel base.			
		The terminals of armature and shunt/series			
		field windings of both the machines are			
		brought over to Bakelite plate fixed on C.I.			
		terminal box fitted on top of machine.			
		Rubber mat for reducing vibration of above			
		system.  Denot Day (48 inch V 24 inch V 8 inch) as			
		Panel Box (48 inch X 24 inch X 8 inch) as			
		per required of 18 gauge CRC sheet, Powder			
		coating, I.P. Protection, Neoprene rubber			
		gasket, Colour- of white. Panel made of two			
		back door & locking arrangements with			
		table top self stand type.			
		(48 inch X 24 inch X 30 inch) wooden table for panel mountain top			
1		2no Digital Voltmeter Panel type (0-300v)			

		(MCV) (4" x 4" or 4" x 2" dial).			
		1no Digital Ammeter Panel type (0-1amp)			
		(MCA) (4" x 4" or 4" x 2" dial).			
		1no Digital Ammeter Panel type (0-10amp)			
		(MCA) (4" x 4" or 4" x 2" dial).			
		3no Digital Ammeter Panel type (0-10amp)			
		(MIA) (4" x 4" or 4" x 2" dial).			
		1no Digital Voltmeter Panel type (0-500v)			
		(MIV) (4" x 4" or 4" x 2" dial).			
		Thyristor control Dc drive (Armature			
		variable voltage, current adjustable, IR			
		compensation, Minimum and maximum			
		speed limits, Field open trip), Variable DC			
		source for both motor and Alternator field.			
		Electrical inductive loading arrangement			
		with minimum 3 steps variation capability.			
		Fuse protection. Overload protection.			
		Off on switch and power plug. Digital			
		noncontact type tachometer. (Range 0-9999			
		RPM). All terminals & electrical			
		instruments are to be available on the			
0.1	D	Bakelite panel board.	0.1	G :	1
04	Determination	2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-	01	Set	
	the	pole Squirrel Cage Induction motor			
	Slip Torque	AC INDUCTION MOTOR			
	characteristics of	Power: 2HP; Voltage: 415±10% V AC;			
	an Induction	Current: 3.3 AC; Speed: 1425 RPM;			
	motor and to	Frequency: 50 C/S; Frame: 80			
	find out the full	Rating: Cont Ins. CL. B; Phase: 3			
	load slip.	DC SEPARATELY EXCITED			
		GENERATOR			
		Power: 2HP; Frame Size: 132; Armature			
		Voltage: 220V DC; Armature Current: 8.3A			
		DC; Field/Exc. Voltage: 220V DC;			
		,			
		Field/Exc. Current: 0.88A DC			
		Speed: 1500 RPM; Duty: S1			
		Encl.: IP-21; Ins. CL.: B; Commutators			
		Segment: 63			
		Brgs D.E.: 6205; Brgs N.D.E.: 6204			
		Rubber mat for reducing vibration of above			
		system.			
		Panel Box (48 inch X 24 inch X 8 inch) as			
		per required of 18 gauge CRC sheet,			
		Powder coating, I.P. Protection, Neoprene			
		rubber gasket, Colour- of white. Panel made			
		of two back door & locking arrangements			
		with table top self stand type.			
		(48 inch X 24 inch X 30 inch) wooden table			
		for panel mountain top. Spring balance			
		arrangement with water-pulley and two			
		spring balance one. Base plate and coupling			
		arrangement one. 1no Voltmeter(0-			
		500v)(MIV), (4" x 4" or 4" x 2" dial).			
		1noAmmeter(0-5)(MIA), (4" x 4" or 4" x 2"			
		dial).			
		1no Wattmeter, (4" x 4" or 4" x 2" dial).			
		1no three phase Variable AC source,			
		1no Voltmeter(0-300v)(MVC), (4" x 4" or			
		4" x 2" dial).			
		1no Ammeter(0-10)(MCA), (4" x 4" or 4" x			
		2" dial).			
	I	<u> </u>	L	<u> </u>	1

		3-phase off-on switch; digital tacho-meter			
		Fuse protection; Electrical resistive type			
		Loading arrangements for DC generator;			
		Overload protection			
		Power plug; All terminals are to be			
		available on the panel board; Instruction			
		Manual			
		All meters (Digital Panel type) are of			
		CABES ELECTRA make (4"x4" or 4" X 2"			
		dial).			
05	To make	1no 1 HP, 3-phase, 415V, 50Hz, 1500 rpm,	01	Set	
	connection	4-pole and 2-pole Squirrel Cage Induction			
	diagram of full	motor			
	pitch &	AC INDUCTION MOTOR			
	fractional slot	Power: 1HP; Voltage: 415±10% V AC			
	winding of 18	Current: 2.1A AC; Speed: 1425 RPM and			
	slot squirrel cage	2800 RPM			
	Induction motor				
		Frequency: 50 C/S; Frame: 80; Rating: Cont			
	for 2 pole & 4	Ins. CL. B; Phase: 3			
	pole operation.	Rubber mat for reducing vibration of above			
		system.			
		Panel Box (48 inch X 24 inch X 8 inch) as			
		per required of 18 gauge CRC sheet,			
		Powder coating, I.P. Protection, Neoprene			
		rubber gasket, Colour- of white. Panel made			
		of two back door & locking arrangements			
		with table top self stand type.			
		(48 inch X 24 inch X 30 inch) wooden table			
		for panel mountain top. 1no Voltmeter(0-			
		500v)(MIV), (4"x4" or 4" X 2" dial). 1 no			
		Ammeter(0-5)(MIA), (4"x4" or 4" X 2"			
		dial). 1no three phase Variable AC source;			
		3-phase off-on switch; digital tacho-meter;			
		Fuse protection; Overload protection; Power			
		pluge. All terminals are to be available on			
		the panel board. All meters (Digital Panel			
		type) are of CABES ELECTRA make			
		(4"x4" or 4" X 2" dial).			
06	Parallel	2 No. Alternator: 1KVA/415V/50Hz/1500	01	Set	
	operation of	rpm	` 1	~~.	
	three phase	2 No. DC Shunt Motor: 2 hp/220V/1500			
	alternator.	_			
	ancinator.	rpm Panel board for the experiment consists of			
		M. S. Channel, Bakelite board.			
		· · · · · · · · · · · · · · · · · · ·			
		It includes the following:			
		For DC MOTOR AS PRIME MOVER			
		2 nos MC Voltmeter 96 x 96 mm digital			
		panel mounted 0-300V. 2 nos MC Ammeter			
		96 x 96 mm digital panel mounted 0-10 A.			
		DC speed regulator and controller			
		Indicating light.			
		FOR ALTERNATOR			
		2 nos MI Voltmeter 96 x 96 mm digital			
		panel mounted 0-500V 2 nos MI			
		Ammeter 96 x 96 mm digital panel mounted			
		0-10 A. 2 nos Frequency meter 96 x 96 mm			
		digital panel mounted 0-10 A. 2 nos			
		Rheostat 1 A. 500 Ohms. Indicating light			
		Motor Alternator coupled with separately in			
		a common base plate (2 sets Coupling			
		arrangement 2 set)			
				•	•

		• Provision of A.C. / D.C. power supply			
		(what ever is needed)			
		ACCESSORIES			
		Tachometer and provision for speed			
		measurement			
		Fuse protection			
		• Off on switch and power plug			
		• Over speed trip			
		Phase failure relay			
		Adjustable reverse current relay			
		• Panel board for the experiment consists of			
		M. S. Channel, Bakelite board (6mm)			
		• All terminals are to be available on the			
		panel board.			
		1			
		• 3 nos Change Over Switch for parallel			
		operation (manual type)			
		• 3 nos Change Over Switch for parallel			
		operation (Push button operated ACB			
		TYPE)			
		• 2 nos Variable DC Source for motor			
		• 2 nos Single Phase Variac for alternator			
		field.			
		• 6 sets 10 w Lamp for lamp method			
		synchronization			
		• 4 nos 50A Copper BUS-BAR.			
		• 1no Frequency Meter with change over			
		switch			
		• 1 no Synchroscope meter with (PT) for			
		synchronization method.			
		• 1 no 0-500V ac meter analog type for			
		synchronization method.			
		All terminals are to be available on the			
		panel board			
		All meters (Digital Panel type) are of			
		CABES ELECTRA make (4"x4" or 4" X 2"			
		dial).			
07	Cut Section of 3	2 HP, 3-phase, 400v, 50Hz, 1500 rpm, 4-	01	Set	
	phase squirrel	pole Squirrel Cage Induction motor.		each	
	cage induction	Alternator: 1KVA/415V/50Hz/1500 rpm			
	motor and				
	Alternator.				

Yours faithfully,

Date

Place: Signature with Seal of Authorized Signatory