INDIRA TECHNICAL INSTITUTE EDUCATION SOCIETY NASHIK

CERTIFICATE COURSE
ARMATURE MOTOR REWINDING [AM]

EXAM SCHEME: THEORY PAPER 100 MARKS – 3 HRS.
PRACTICAL 100 MARKS – 2 HRS.

[MW / DEES – (EL) – II / ADEES – (EL) – II]

THEORY SYLLABUS

1. BASIC ELECTRICITY

- Study of voltage, current , resistance and their units
- Ohm's Law
- Series and Parallel circuit and their properties with respect to winding
- Types of Loads – Inductive, Resistive, Capacitive
- Power, Power factor, Disadvantages due to low power factor.
- Methods of improve P. F. by using capacitor Bank.
- To study types of supply.

2. TOOLS, AND WIRES WINDING MATERIAL, VARNISHING

- Study of tools required for winding and study of their application. Types of plier, Types of Saw, Types of hammers, Special Tools required for winding work like – Blow lamp, seasor, center punch, Bearing puller, wire pusher, Coil spreader, soldering iron etc.
- Study of various types of insulating materials with respect to insulation class an temperature.
- Insulating paper, sleeves, Tapes, wedges, varnish, Thread's etc.
- Study about winding wires Enameled copper wire.
- Varnishing Dipping and Brushing.
- Study reason of varnishing, method's of varnishing.
- Pretest before taking up winding for varnishing.

3. SPECIAL INSTRUMENTS REQUIRED IN WINDING AND METERS

- Special instrument required for winding work
- To measure gauge of conductor – S.W.G.
- To measure diameter of conductor – micro meter.
- For testing of motor's – series parallel testing board
- For armature testing – Growler.
- Meters used in winding work
  Voltmeter, Ammeter, Wattmeter, Multi meter, Oho Meter, Clamp tester, Digital etc.

4. MAGNET AND MAGNETISM

- Study about magnet, Properties and types of magnet.
- Study of electro magnet.
- Definitions related to magnet Like – magnetic pole magnetic field, magnetic lines, polar Axis, magnetic induction.
- To study various laws related to electro magnet, Right hand rule, cork screw Rule, Fleming's right and left hand rule, faradays law of electro magnetic induction.
- Self induction and mutual induction.

5. D. C. MOTORS

- Definition of motor, it's application, Types of motors A.C. and D.C.
- Main parts of D. C. Motors – yoke, pole core, pole snoe, field coil, Armature, brush, bearing, front & End plate.

- Working of D. C. Motor
- Types of D. C. motor series, shunt and compound motor
- Types of slot's make of starter, Armature and rotor – Open type slot, Semi close slot, close type slot.
- How to start D. C. shunt motor.
- Losses and faults produces in D. C. motor.
- Armature reaction
- Inter pole.

6. TRANSFORMER, ALTERNATOR

- Definition, working principle of Transformer
- Main parts of Transformer
- Step up and HT Transformer.
- Transformer Ratio
- Cooling method's of Transformer.
- Current Transformer (CT) and Potential Transformer (PT)
- Study of alternator, definition and working principal of Alternator.
- Various terms used with reference to AC supply for ex – Alternating current, cycle, frequency, Time period, peak value, R.M.S. value.
- Study of star Delta connection
- Know about poly phase.

7. A. C. MOTORS 91 PH, 3 PH) AND STARTERS

- Definition of motor
- Working principal of 3 ph and 1 ph motor's
- To study various parts of A. C. motor
- Study about various single phase motors
- Split phase motor's
- Capacitors motor's
- Shaded pole motor
- Universal motor.
- Study about various Three phase motors.
- 3 ph squirrel cage induction motor
- Slip ring Induction motor
- Faults and their reasons produce in A. C. Motors
- Testing of Motor
- Motor's and their applications
- Starters required for 3 phase motors
  D.O.L. starter, Semi and Automatic star Delta starter R/F switch, Auto transformer starter.

8. CAPACITOR

- Study the construction of capacitor
- Some definition relating to capacitor Like Capacitance, capacitive Reactance.
- Series parallel connections of capacitor
- Testing of capacitor
- Use of capacitor in electrical field.

9. WINDING TERMS

- Study of various forms used in winding like Coil pitch, Coil span, Pole pitch, front pitch back pitch.
- Know about Armature winding.
- Lap and wave winding
- Progressive and retrogressive winding
- Single, Double and Triple layer winding
- Study about how prepare Data and diagram of Armature winding
- Balancing of armature.
- Study of 1 ph stator winding Data / Drawing and which points to be noted when the done winding work.

- ❖ Study of 3 ph stator winding Data / Drawing and which points to be noted when the done winding work.
- ❖ Various definition related to winding like Coil, coil side, coil led, Tapping, Coil Group per phase coil, Layer and Double Layer winding in 3 ph motor.
  (Winding Drawing list same as give in practical list)

SCHEME OF EXAMINATION

THEORY	100 MARKS
PRACTICAL	75 MARKS
JOURNAL	15 MARKS
ORAL	10 MARKS

GUIDELINE FOR PAPER SETTER (THEORY)

Inst. :- Q. No. 1 is compulsory, Solve any Five questions from Q. 2 to Q. 7. 100 Marks

Q. 1 Compulsory and Objective type 20
(Fill in the blanks, True or False, Match the pair, Answer in one sentence etc.)

Q. 2 Topic 1,8 16
- ❖ Topic No. 1= 60%, Topic No. 8 = 40%

Q. 3 Topic 2 16

Q. 4 Topic 3 16

Q. 5 Topic 4, 5 16
- ❖ 50% Each Topic.

Q. 6 Topic 6, 7 16
- ❖ 50% Each Topic.

Q. 7 Topic 9 16
- ❖ Same Instructions like above.
- ❖ Write any five Question from Question No. 2 To Question No. 7.