

- Instructions :** (1) All Questions are compulsory.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

1. Attempt any **TEN** of the following: [20]
- (a) Define RMS value of an AC quantity.
 - (b) Draw connection diagram of ammeter, voltmeter and wattmeter with AC supply.
 - (c) Give different ratings of energy meter.
 - (d) State any two parts of D.C. motor along with function.
 - (e) Define KVA rating of transformer.
 - (f) State any two important applications of autotransformer.
 - (g) List the applications of universal motor (any four).
 - (h) How the direction of rotation of 3 phase induction motor is reversed?
 - (i) State two limitations of individual drive.
 - (j) Name any two electrical machines used in electro-agro system.
 - (k) Write the full form of MCCB and LECB.
 - (l) Compare AC and DC quantity.
2. Attempt any **FOUR** of the following: [16]
- (a) Draw the circuit diagram and waveforms of voltage and current in RC series circuit.
 - (b) Compare two winding transformer with autotransformer.
 - (c) Draw single line diagram showing electrical power supply sche.
 - (d) Describe the working of electro-dynamometer type wattmeter with the help of diagram.
 - (e) Write four advantages of polyphase supply systems over single phase systems.
 - (f) Explain the construction of alternator with diagram.
3. Attempt any **FOUR** of the following: [16]
- (a) Current flowing through the circuit is $I = 141.4 \sin\left(314t - \frac{\pi}{2}\right)$ Amp.
Calculate : (i) Frequency (ii) Rms value
(iii) Phase difference (iv) Amplitude
 - (b) An RL series circuit consists of 100 Ω resistance and 0.22 H inductance connected across 220 V, 50 Hz AC supply. Calculate : (i) Impedance (ii) Current (iii) Voltage across resistor (iv) Voltage across inductor
 - (c) Derive emf equation of transformer.

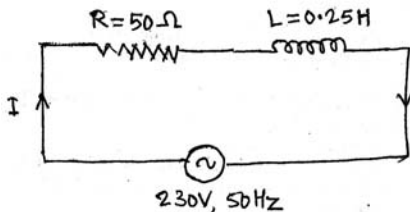
- (d) With diagram, explain the speed control of induction motor by VFD method.
- (e) Draw and explain capacitor start and run single phase induction motor.
- (f) A single phase 230 V/150 V, 1 kVA, 50 Hz transformer is supplied by 230 V AC supply. Find the full load primary and secondary currents.

4. Attempt any **FOUR** of the following: [16]

- (a) Draw delta connected load. State the relationship between line and phase values for the same.
- (b) Explain in brief the working of universal motor and state its applications.
- (c) What is electroplating? Give its two applications.
- (d) Compare squirrel cage and slip-ring induction motor on any four points.
- (e) Explain shaded pole induction motor with sketch.
- (f) Write factors for selection of motor for electric drives.

5. Attempt any **FOUR** of the following: [16]

- (a) Calculate voltage across individual element for the circuit.



- (b) List any four types of electric motor enclosures and state one advantage of each.
- (c) A 4 pole, 50 Hz squirrel cage induction motor runs on load at a speed of 1000 rpm. Calculate : (i) The percentage slip
(ii) The frequency of induced current in the rotor
- (d) Why starters are required? Draw neat sketch of DOL starter.
- (e) Explain with sketch, direct resistance heating.
- (f) Draw neat wiring diagram of control 2 lamps, 2 fans and 1 socket.

6. Attempt any **FOUR** of the following: [16]

- (a) Draw the circuit diagram and waveforms of voltage and current in RL series circuit.
- (b) State the necessity of earthing. State types of earthing.
- (c) A balanced 3-phase star connected load is supplied from a 3-phase, 400V, 50Hz, supply. The resistance per phase is 10 ohm. Find the value of phase current, line current, power factor and total power consumed.
- (d) Draw speed-torque characteristics of DC shunt and series motors and explain in brief.
- (e) Give any two applications of :
(i) Stepper motor and (ii) Servo motor
- (f) Explain the various safety precautions to be taken while handling an electric equipment.

