

Vidyalankar

S.Y. Diploma : Sem. IV [ME/MH/MI/PG/PT]

Electrical Engineering

Prelim Question Paper

Time: 3 Hrs.]

[Marks : 100

- Instructions :**
- (1) All questions are compulsory.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data if necessary.
 - (5) Preferably, write the answers in sequential order.

1. Attempt any **TEN** of the following: [20]
- (a) Define : (i) Generator, (ii) Invertor.
 - (b) Explain the digital instruments.
 - (c) Give the classifications of indicating instruments.
 - (d) State the factors on which torque of motor depends upon.
 - (e) Define Iron Losses and their types in transformers.
 - (f) State any two disadvantages of AC motor.
 - (g) Write the type of stepper motors.
 - (h) Sketch the symbol : (i) 5A socket outlet, (ii) SPDT.
 - (i) Write the type of Tariff.
 - (j) State any two advantages of static capacitors.
 - (k) State use of test lamp to check phase voltage.
 - (l) Explain three part tariff.
2. Attempt any **FOUR** of the following: [16]
- (a) State the expansion of the following terms :
(i) VIR (ii) CTS (iii) PVS (iv) MCCB (v) ELCB
 - (b) Explain the universal motor with neat sketch.
 - (c) Explain with neat sketch :
(i) Coreless Furnance (ii) Dielectric heating
 - (d) Give the comparison between voltmeter and ammeter.
 - (e) An alternating voltage is mathematically expressed as
$$V = 141.42 \sin \left(157.08t + \frac{\pi}{12} \right) \text{ volt.}$$

Find maximum value, RMS value, frequency and periodic time.
 - (f) Explain the types of induction motor.
3. Attempt any **FOUR** of the following: [16]
- (a) Draw constructional details of PMMC instruments and label its different parts.
 - (b) Write four advantages of polyphase supply systems over single phase systems.
 - (c) Derive voltage equation of DC motor and from it explain the significance of back emf.
 - (d) Derive the EMF equation of a transformer.

- (e) Explain with neat sketch electroplating.
- (f) What is energy audit, its role and content of an audit.

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

- (a) State the advantages and disadvantages of Dynamometer type of instruments.
- (b) A coil having resistance 10 ohm and an inductance 0.2H is connected across 100 volt, 50 Hz, supply. Calculate:
 - (i) Reactance
 - (ii) Impedance
 - (iii) Current
 - (iv) Power consumed
- (c) Draw schematic diagram of DC motor name its part and state the material used in each parts and its functions.
- (d) A 50 Hz 4-pole, 3-phase induction motor has a rotor current of frequency 2 Hz. Determine : (i) slip, (ii) speed of motor.
- (e) Explain Reluctance stepper motors.
- (f) Give the comparison between star connection and delta connection.

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

- (a) Explain how to convert galvanometer into voltmeter.
- (b) In damping torque which type of damping is preferred and why?
- (c) Plot the three characteristics for :
 - (i) DC shunt motor
 - (ii) DC series motor
- (d) Write comparison between squirrel cage and slip ring motors.
- (e) Explain the term symmetrical 3-phase Ac supply :
 - (i) Draw phasor diagram
 - (ii) Write the equation for 3-phase voltages
 - (iii) Draw waveforms for 3-phase voltages
- (f) Explain the tariff and their types.

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

- (a) Define : (i) RMS, (ii) DC, (iii) Form factor, (iv) Peak factor.
- (b) Give constructional details of induction types energy meter and state its application.
- (c) Write the comparison between core and shell type transformer.
- (d) 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.
- (e) Explain the earthing and their necessity.
- (f) Explain the various safety precautions to be taken while handling an electric equipment.

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