

22221

11920

3 Hours / 70 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

5 × 2 = 10

- (a) State Fleming's left hand rule.
- (b) Define the following terms related to sinusoidal AC waveform :
 - (i) Instantaneous value
 - (ii) Cycle
- (c) Define :
 - (i) RMS value
 - (ii) Average value w.r.t. sinusoidal AC waveform.
- (d) Define :
 - (i) Balanced system
 - (ii) Balanced Load w.r.t. 3 phase system

- (e) Differentiate squirrel cage and slip ring IM on any two parameters.
- (f) Give any two applications of universal motor.
- (g) State the operation of Rewireable Fuse.

2. Attempt any THREE of the following :

3 × 4 = 12

- (a) Write any two similarity and any two dissimilarity between magnetic and electric circuit.
- (b) Draw the power triangle and define active, reactive and apparent power.
- (c) State the working principle of transformer. Also write the expression for
 - (i) Emf equation
 - (ii) Transformation ratio.
- (d) List the different starters used for 3 phase IM and draw a neat sketch for any one of them.

3. Attempt any THREE of the following :

3 × 4 = 12

- (a) Define :
 - (i) Magnetic flux
 - (ii) Magnetic flux density
 - (iii) m.m.f.
 - (iv) Permeability
- (b) A balanced 3 phase delta connected load consists of three resistances each of 4 ohms connected to a 400 V, 3 phase, 50 Hz supply.
Find :
 - (i) Phase current
 - (ii) Line current

- (c) Draw the schematic diagram of
 - (i) DC shunt motor
 - (ii) DC series motor
- (d) Explain the operation of MCB against overload and short circuit.

4. Attempt any THREE of the following :

3 × 4 = 12

- (a) Explain the concept of Dynamically and statically induced emf.
- (b) Justify the reason why 3 phase Induction motor can never run on synchronous speed.
- (c) State the material used and function of the following parts of DC Motor :
 - (i) Yoke
 - (ii) Field winding
- (d) Draw the schematic diagram of shaded pole motor and state its principle of operation.
- (e) Draw a neat labelled sketch of pipe earthing.

5. Attempt any TWO of the following :

2 × 6 = 12

- (a) Define :
 - (i) Phase angle
 - (ii) Phase difference and explain the concept of lagging and leading w.r.t. sinusoidal AC quantity.
- (b) Three equal impedances are star connected to a 3 phase, 400 V, 50 Hz supply. If the inductive reactance and resistance of each branch are 8Ω and 6Ω , Calculate :
 - (i) Phase current 2
 - (ii) Line current 1
 - (iii) Power factor 1
 - (iv) Total power consumed 2
- (c) Explain the basic principle of operation of Brushless DC motor and given any 2 applications of the same.

P.T.O.

6. Attempt any TWO of the following :**2 × 6 = 12**

- (a) A coil having resistance of 5Ω and an inductance of 31.8 mH is connected across a 200 V, 50 c/s supply.

Calculate :

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|----------------------------|---|
| (i) Reactance of the coil | 1 |
| (ii) Impedance of the coil | 1 |
| (iii) Current taken | 1 |
| (iv) Power factor | 1 |
| (v) Total Power Consumed | 2 |
- (b) For a capacitor start, Induction run single phase IM :
- | | |
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| (i) Show the schematic representation. | 3 |
| (ii) Explain its principle of working. | 2 |
| (iii) Any two applications. | 1 |
- (c) (i) State the purpose of earthing. 2
- (ii) Also explain any two methods of reducing earth resistance. 4
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