

22215

24225

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) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define (i) Magnetic flux (ii) Flux Density.
- (b) Write any two advantages of AC over DC.
- (c) State the relationship between line and phase values for 3 phase star connection.
- (d) Write two applications of DC shunt Motor.
- (e) Write any four main parts of DC motor.
- (f) Suggest suitable motor for following applications –
 - (i) Food Mixer
 - (ii) Electric Fan
- (g) List the types of Fuses.

2. Attempt any THREE of the following :

12

- (a) Compare electric and magnetic circuit on any four points.
- (b) Explain the concept of lagging & leading phase angle by waveform.



- (c) Compare Star and Delta connection on the basis of
 - (i) Connection diagram
 - (ii) Neutral
 - (iii) Line and phase current
 - (iv) Line and phase voltage
- (d) Explain the working principle of Autotransformer with neat diagram.

3. Attempt any THREE of the following :

12

- (a) Explain series and parallel magnetic circuit with neat diagram.
- (b) Draw Schematic diagram of
 - (i) DC shunt motor
 - (ii) DC series motor
- (c) Explain the working principle of Universal motor with neat diagram.
- (d) Explain the working of MCCB.

4. Attempt any THREE of the following :

12

- (a) A coil of 500 turns wound uniformly on an iron ring of mean circumference 50 cm and cross sectional area of 4 cm^2 , carries a current of 1 A. Find MMF.
Field strength
Reluctance
Flux
Take $\mu_r = 1000$
- (b) For a transformer, give
Any two main parts,
Any two ratios,
Any two types and
Any two losses.

- (c) Explain Principle of operation of Shaded pole motor with neat diagram.
- (d) Draw a neat sketch of permanent capacitor 1ϕ induction motor. Explain its working.
- (e) Explain Pipe Earthing with neat sketch.

5. Attempt any TWO of the following :

12

- (a) An alternating voltage is represented by $V = 200 \sin (314t + \pi/3)$ volt is applied to a load.

Calculate

- (i) Max. value
- (ii) Frequency
- (iii) RMS value
- (iv) Average value
- (v) Form factor
- (vi) Peak factor

- (b) A 3 phase balanced load contains $R = 12 \text{ ohm}$ in each phase. It is connected in star across a 230V, 50Hz, 3ϕ AC.

Calculate –

- (i) V_{ph}
- (ii) Z_{ph}
- (iii) I_{ph}
- (iv) I_L
- (v) pf
- (vi) P

- (c) 10 kVA, 2200/200 V, 50 Hz single phase transformer has 80 turns on secondary winding. Calculate number of primary winding turns, full load primary and secondary currents and maximum value of flux in the core.

6. Attempt any TWO of the following :**12**

- (a) Draw a neat schematic diagram of Capacitor start Capacitor run induction motor. State its principle of operations. Write the application of the same.
 - (b) With neat sketch explain principle of operation of ELCB. Write any two applications of it.
 - (c) Write two applications of each of following :
 - (i) Fuse
 - (ii) MCB
 - (iii) MCCB
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