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23242

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 :

10

- (a) State Faraday's first law of electromagnetic induction.
- (b) Define :
 - (i) Time period
 - (ii) Frequency
- (c) Draw three phase voltage waveform of a.c. supply w.r.t. time.
- (d) State emf equation of transformer.
- (e) List any two applications of DC shunt motor.
- (f) Suggest suitable motor for following application :
 - (i) Food mixer
 - (ii) Electric fan
- (g) List out types of earthing.



2. Attempt any THREE of the following : 12

- (a) Compare electric circuit and magnetic circuit (any four points).
- (b) Draw neat waveform and vector diagram for pure resistance and pure inductance.
- (c) Draw star connected load and state relation between (i) V_L and V_{ph} (ii) I_L and I_{ph} .
- (d) Draw the constructional diagram of D.C. motor and give name of each of the parts.

3. Attempt any THREE of the following : 12

- (a) Explain the concept of dynamically emf and statically emf with neat diagram.
- (b) Compare auto transformer with two winding transformer (any four points).
- (c) Draw neat sketch of capacitor start induction motor and explain its working principle.
- (d) Describe working principle of ELCB with neat diagram.

4. Attempt any THREE of the following : 12

- (a) A coil of 500 turns and resistance of 20Ω is wound uniformly on an iron ring of mean circumference 50 cm and cross sectional area 4 cm^2 . It is connected to 24 V d.c. supply, relative permeability of the material is 800. Find (i) MMF (ii) Field strength (iii) Flux (iv) Reluctance.
- (b) Draw schematic diagram of transformer and explain its working principle.
- (c) Explain the working principle of universal motor with neat diagram.
- (d) With neat sketch write the working principle of stepper motor.

- (e) For pure capacitive circuit (i) Draw neat sketch (ii) Draw waveform of voltage and current (iii) Write equation for voltage and current (iv) Draw phasor diagram.

5. Attempt any TWO of the following :

12

- (a) An alternating voltage represented by $V = 200 \sin[314 t - 60^\circ]$ voltage is applied to a load. Calculate :
- (i) Maximum voltage
 - (ii) RMS voltage
 - (iii) Average voltage
 - (iv) Phase angle
 - (v) Time period
 - (vi) Frequency
- (b) If a three phase 415, 50 Hz, supply is connected to a balanced three phase star connected load of impedance $(4 + j 5.6)\Omega$ per phase. Calculate :
- (i) I_{ph}
 - (ii) V_{ph}
 - (iii) p.f.
 - (iv) Active Power
 - (v) Reactive power
 - (vi) I_L
- (c) Describe construction and working principle of :
- (i) Isolation transformer
 - (ii) Pulse transformer

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

- (a) Draw schematic diagram of split phase induction motor and explain its working principle. List any two applications of same.
 - (b) State necessity of earthing. Explain any one with neat diagram.
 - (c) List any two applications of the following :
 - (i) Fuse
 - (ii) MCB
 - (iii) MCCB
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