

22232

12425

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each Section on separate answer sheet.
 - (3) Answer each next main Question on a new page.
 - (4) Illustrate your answers with neat sketches wherever necessary.
 - (5) Figures to the right indicate full marks.
 - (6) Assume suitable data, if necessary.
 - (7) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (8) Preferably, write the answers in sequential order.

SECTION – I

Marks

1. Attempt any SIX of the following :

12

- (a) Define :
 - (i) EMF (ii) Current
- (b) Define :
 - (i) Reluctance (ii) Flux density
- (c) State Fleming's left hand rule.
- (d) Define :
 - (i) Cycle (ii) Phase angle using AC waveform.
- (e) Define Power factor with mathematical formula.
- (f) State type of transformer with transformation ratio
 - (i) More than 1, (ii) Less than 1
- (g) Classify single phase AC motors (any two).



2. Attempt any THREE of the following :**12**

- (a) Derive equation for mutually induced emf.
- (b) If the emf represented by the equation $e = 150 \sin 314t$, what is its maximum value and the frequency ? Find the instantaneous voltage at $1/300$ sec after origin (considering emf at origin = 0 V).
- (c) Explain clearly the terms : (i) Maximum value (ii) Instantaneous value (iii) RMS value (iv) Average value of an alternating quantity.
- (d) Explain the working principle of single phase transformer with neat sketch.

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

- (a) State significance of B-H curve and area under hysteresis loop. Draw hysteresis loop for
 - (i) Non-Magnetic material (ii) Magnetic material.
- (b) Draw power triangle, state significance of power factor. Draw AC circuits showing
 - (i) Unity power factor (ii) Leading power factor (iii) Lagging power factor.
- (c) List various Losses in transformer. State the various parts of transformer where these losses take place. State remedies to minimize these losses.

SECTION – II**4. Attempt any FIVE of the following :****10**

- (a) State the difference between Active and Passive electronic components.
- (b) Calculate the value / colour code of resistor
 - (i) Brown Red Green Gold (ii) $15\Omega \pm 10\%$.
- (c) Draw symbol and construction of PN junction diode.
- (d) Draw circuit diagram of Bridge rectifier.
- (e) Draw symbol and construction of NPN transistor denoting terminals.
- (f) State input and output resistances for CE, CB, CC configurations.
(High/Low/ ∞)

5. Attempt any THREE of the following : 12

- (a) State the meaning of integrated circuits. List two types of it and give one advantage of each type.
- (b) Compare P-N junction diode and zener diode with any four points.
- (c) Explain working principle and construction of Light Emitting Diode (LED).
- (d) Describe the application of transistor as a switch with sketch.

6. Attempt any TWO of the following : 12

- (a) Explain the following signals with neat sketches :
 - (i) Sinusoidal
 - (ii) Triangular
 - (iii) Square
 - (b) Compare Half wave and Bridge type rectifier on the basis of No. of diodes, Transformer necessity, Max. efficiency, Ripple factor, Output frequency, Peak inverse voltage with tabular form.
 - (c) Draw the input and output characteristics of CB connection. Write any two observations from these characteristics.
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