

22215

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) 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 law of Electromagnetic Induction.
 - b) Define following terms with respect to A.C. quantity.
 - (i) Time period
 - (ii) Frequency
 - c) State the relationship between line current and phase current for star and delta connection.
 - d) State the working principle of transformer.
 - e) Write any four main parts of d.c. motor.
 - f) Write any two applications of each motor.
 - (i) Universal motor
 - (ii) Stepper motor
 - g) State any two methods of reducing earth resistance.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Draw and explain B-H curve of magnetic material.
 - b) Draw purely capacitive circuit. Show vector diagram and waveform and write formula for capacitive reactance.
 - c) Compare star and delta connection on basis
 - (i) Connection diagram
 - (ii) Neutral
 - (iii) Line and phase current
 - (iv) Line and phase voltage.
 - d) Compare auto transformer with two winding transformer on following basis.
 - (i) Symbol
 - (ii) Copper saving
 - (iii) Isolation
 - (iv) Application
- 3. Attempt any THREE of the following:** **12**
- a) Explain with neat diagram Lenz's law. State its any two applications.
 - b) Explain the working principle of d.c. motor with neat sketch.
 - c) Explain the principle of operation of capacitor start capacitor run motor.
 - d) Explain the importance of earthing.

- 4. Attempt any THREE of the following:** **12**
- a) Explain how Fleming's right hand rule helps to deciding direction of induced EMF.
 - b) Write any two applications of each of the following.
 - (i) DC Shunt motor
 - (ii) DC series motor.
 - c) Explain principle of operation of universal motor with neat diagram.
 - d) Explain how direction of rotation of universal motor is reversed.
 - e) Explain the working of fuse with neat diagram.
- 5. Attempt any TWO of the following:** **12**
- a) A sinusoidal voltage with equation
 $V = 200 \sin (314 t + \pi/3)$ volt is applied to a load.
Calculate
 - (i) Maximum voltage
 - (ii) RMS voltage
 - (iii) Frequency
 - (iv) Time period
 - (v) Phase angle
 - (vi) Angular frequency.
 - b) Three similar coils each of resistance 20Ω and on inductance 0.1 H are connected in delta to a 3ϕ 440V , 50 Hz supply system. Calculate the phase current, line current, phase voltage, line voltage, active power and reactive power.
 - c) A 1ϕ . 1.5 KVA . $230/110 \text{ V}$ transformer used in a laboratory.
Calculate primary winding current.
 - (i) Secondary winding current
 - (ii) Turns ratio.
 - (iii) Current ratio

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

- a) Explain the principle of working of stepper motor with a neat diagram.
 - b) Explain the operation of each of the following
 - (i) Fuse
 - (ii) ELCB
 - c) Write any two applications of each of the following
 - (i) ELCB
 - (ii) MCCB
 - (iii) MCB
 - (iv) Fuse
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