

# 17957

16117

**3 Hours / 100 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 TEN of the following:** **20**
- a) List the stages of electrical power system.
  - b) Define the term inductive reactance.
  - c) Define frequency and cycle in case of alternating quantity.
  - d) State the function of damping torque in measuring instruments.
  - e) Give four applications of Digital Multimeter.
  - f) State the function of commutator in a dc motor.
  - g) State Fleming's Left Hand Rule.
  - h) Define transformation ratio of transformer.
  - i) State the working principle of transformer.
  - j) Define regulation in case of a transformer.

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- k) Define slip and write the formula to determine percentage slip.
- l) Write two applications of stepper motor.
- m) State the classification of drives.
- n) State the necessity of earthing.

**2. Attempt any FOUR of the following: 16**

- a) State the advantages of 3 phase supply system over single phase supply system. (any four)
- b) Explain the construction and working of electrodynamic wattmeter.
- c) A 1  $\phi$ , 50 Hz 230/115 V 1 KVA transformer is supplied by 230 V supply. Find full load primary and secondary currents.
- d) Explain the working of 1  $\phi$  capacitor start induction run motor.
- e) Explain the working principle of electrical heating. Give any two types.
- f) Write fire extinguishing and pf improving methods. (two each)

**3. Attempt any FOUR of the following: 16**

- a) A coil having resistance 10 ohm and inductance 0.2 henry is connected across 100 V . 50 Hz supply. Calculate
  - (i) Reactance  $X_L$
  - (ii) Impedance
  - (iii) Current
  - (iv) Power factor
- b) Three impedances each of 2 ohm resistance and 2 ohm inductive reactance are connected in delta across 3  $\phi$  400 V ac supply. Determine phase current, line current and reactive power.
- c) Give the meaning of back emf. State its significance for D.C. motor.
- d) Derive the emf equation of a transformer.
- e) Compare squirrel cage induction motor with slip ring induction motor. (any four points)
- f) List various enclosures used in industry.

- 4. Attempt any FOUR of the following:** **16**
- a) Define rms value and average value write the relations of them for voltage and current.
  - b) Compare Auto transformer with two winding transformer.
  - c) Write the procedure to find efficiency of a given 1 pH transformer by direct loading method.
  - d) Draw and explain torque-slip characteristics of a 3 pH. Induction motor.
  - e) A 3 -  $\phi$ , 4 pole induction motor runs at 1440 rpm. Find % slip at this speed.
  - f) Explain principle of Induction heating with neat diagram.
- 5. Attempt any FOUR of the following:** **16**
- a) Draw a circuit diagram for series R-L circuit. Write equation for voltage and current. Draw vector diagram.
  - b) State and explain working principle of 3 phase induction motor.
  - c) Write four major components of Alternator. State function of each.
  - d) State factors for selection of motor for different drives. (any four)
  - e) Compare individual drive with ground drive.
  - f) Give advantages and disadvantages of CFL lamps. (two each)
- 6. Attempt any FOUR of the following:** **16**
- a) Draw a circuit of DOL starter for 3 phase induction motor.
  - b) Write any four applications of stepper motor.
  - c) Describe basic principle of electroplating with neat sketch.
  - d) Write function of MCB and ELCB.
  - e) Define Tariff. State different types of tariff.
  - f) State different types of power and their expression for 3 phase system. Draw power triangle.
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