

17404

21314

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) Define electrical supply system and state its types.
- b) State the principle of PMMC type instrument.
- c) How should an ammeter and voltmeter be connected in an electric circuit to measure current and voltage.
- d) State any two application of d.c. series motor.
- e) State the types of transformer based on construction.
- f) State why transformer rating is in KVA.

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- g) State factors that determines the direction of rotation of three phase induction motor.
- h) State the necessity of earthing.
- i) State any four types of tariff.
- j) State how does the slip of three phase induction motor vary with load.
- k) State any two application of universal motor.
- l) List the different types of enclosures for electric motors (any four).

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

16

- a) Define inductive reactance and capacitive reactance with respect to A.C. circuit.
- b) Describe the concept of current and voltage and give units for them.
- c) State any four advantages of three phase system over single phase system.
- d) Draw circuit diagram, waveform, phasor diagram and comment on the phase relationship between voltage and current in R-C series circuit.
- e) If $V_L = 400 \text{ V}$ and $I_L = 10 \text{ A}$. Calculate the respective phase values for a
 - i) Delta connection
 - ii) Star connection.
- f) Draw a neat labelled diagram of attraction type moving iron instrument and state its principle of operation.

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

- a) List the main parts of d.c. motor. Write the function of any four parts.
- b) Draw a labelled circuit diagram to determine percentage efficiency and regulation of a single phase transformer by direct loading test and write the rating of meter for a 220/110 V, 1 KVA transformer.
- c) Compare auto transformer with two winding transformer on the basis of construction, efficiency, size and application.
- d) A voltage equation is expressed as $V = 70.7 \sin 314 t$. Determine:
 - i) maximum value of voltage
 - ii) rms value of voltage
 - iii) frequency and time period of waveform.
- e) A coil consist of 20 ohm resistance and 0.2 H inductance is connected across 230 V, 50 Hz supply. Calculate:
 - i) impedance of coil
 - ii) power factor
 - iii) current
 - iv) active power.
- f) A 20 KVA, 3000/300 V, 50 Hz single phase transformer has 800 turns on the primary.
Determine:
 - i) no. of turns on secondary
 - ii) maximum flux in the core.

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

- a) Describe with neat sketch the working principle of a transformer.
- b) Suggest suitable single phase motors for the following applications:
 - i) washing machine
 - ii) water pump
 - iii) electric clock
 - iv) grinder
- c) Draw a neat labelled diagram of direct on line starter used for three phase induction motor.
- d) State the factors to be considered while selecting the motors for different drive.
- e) Describe the construction of stepper motor (any type) with neat sketch. State two applications of it.
- f) List any four advantages of having a stationary armature winding in case of three phase alternator.

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

- a) Draw a typical torque-speed characteristic of an induction motor. Describe its nature.
- b) Explain the method of speed control of IM by VFD using block schematic.
- c) State the meaning of electric drive. Give classification of electric drive.
- d) A 3 phase, 4 pole, 50 Hz squirrel cage induction motor runs at 1450 rpm. Determine percentage slip and frequency of rotor emf.

- e) Describe with a neat diagram, the process of any one type of electric welding.
- f) Describe indirect resistance heating method with suitable example.

6. Attempt any FOUR of the following:

16

- a) Give the meaning of electroplating. Give any two application of it.
 - b) State the importance of energy conservation and audit.
 - c) Draw simple electrical wiring diagram for the control of one lamp, one socket, one fan with regulator and fuse.
 - d) State the applications of following:
 - i) CFL lamp
 - ii) Fluorescent lamp
 - iii) MCB
 - iv) ELCB
 - e) List the applications of electrical machine in electro agro system.
 - f) State any four fire extinguishing method adopted in electrical engineering.
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