



# 17404

21718

3 Hours/100 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions :**
- (1) All questions are **compulsory**.
  - (2) Illustrate your answers with **neat** sketches **wherever** necessary.
  - (3) Figures to the **right** indicate **full** marks.
  - (4) Assume suitable data, **if** necessary.

**Marks**

1. Attempt **any ten** :

**20**

- a) Define:
  - i) Frequency
  - ii) Period.
- b) State working principle of PMMC meter.
- c) Prove  $N = N_S(1 - S)$ .
- d) State two applications of universal motor.
- e) State the types of transformers on the basis of construction.
- f) Define:
  - i) Transformation ratio
  - ii) Voltage ratio.
- g) Define rotating magnetic field of an induction motor.
- h) Name any two electrical machines used in electro agro system.
- i) State the types of heating and welding.
- j) State any two applications of multimeter.
- k) Draw neat labelled diagram of capacitance start motor.
- l) State any two factors for selection of motors as drives.

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

**16**

- a) Draw star connected three phase load circuit. Mark line vtg., phase vtg., line current and phase current. Also write relation of active power and reactive power.
- b) Draw and explain torque-armature current characteristic of DC shunt motor.
- c) State working principle of electric welding. Give two applications of it.
- d) State two applications of each :
  - i) Shaded pole motor
  - ii) Capacitor start capacitor run motor.
- e) Write down any four points of differentiation of star and delta connection.
- f) Draw experimental setup for short circuit test of single phase, 230/115V, 1KVA transformer with proper meter ranges of meters.

**P.T.O.**



- 3. Attempt any four of the following :** **16**
- A  $318 \mu\text{F}$  capacitor is connected across a 230 V, 50 Hz supply. Find current flowing through the circuit, vtg. across the capacitor, capacitive reactance and draw phasor dig.
  - Derive emf equation of transformer.
  - Compare auto transformer and single phase two winding transformer. (any four points).
  - A circuit having resistance of  $5 \Omega$  and  $L = 0.4 \text{ H}$  are connected in series across a 100 V, 50 Hz supply. Calculate. a) Impedance, b) Inductive reactance, c) Current flowing through the circuit, d) Active power.
  - A vtg.  $v = 100 \sin 314 t$  is applied across a circuit consisting of  $25 \Omega$  and capacitor of  $80 \mu\text{F}$  capacitor in series. Determine i) Maximum value of current, ii) Reactive power.
  - Describe any one fire extinguishing method useful for electrical laboratory.
- 4. Attempt any four of the following :** **16**
- Current flowing through the circuit is  $i = 141.4 \sin (314 - \pi/6)$ . Calculate :
    - Amplitude
    - RMS value of current
    - Frequency
    - Phase difference.
  - Draw a neat single line diagram of electrical power system with voltage levels.
  - A three phase 50 Hz, 4 pole, induction motor operated at a slip of 4%. Calculate : Synchronous speed and actual speed.
  - State types of enclosures of electric drives.
  - Draw neat labelled circuit diagram of “star delta” starter of three phase induction motor.
  - State two applications of each :
    - Servo motor
    - Stepper motor.
- 5. Attempt any four of the following :** **16**
- State working principle and specifications of stepper motor.
  - Draw a circuit diagram of DOL starter for three phase induction motor.
  - State the types of tariff and describe any one in brief.
  - State the types of an alternator. Which types of rotor is suitable for slow speed diesel engines ?
  - What is electroplating ? Give its two applications.
  - Draw the speed Vs. armature current and speed Vs. torque characteristics of D.C. series motor.
- 6. Attempt any four of the following :** **16**
- State advantages of electric heating over the other types of heating methods.
  - Define the voltage regulation of transformer. Why the rating of transformer is given in terms of KVA and not in KW ?
  - Explain any one p.f. improvement method.
  - Draw a circuit dig. for controlling one lamp by two switches.
  - Enlist any four types of lamps and explain any one used for domestic application.
  - State the necessity of enclosures for motors. Enlist one application of each type of enclosure used for electric drives.
-