

ELECTRICAL TECHNOLOGY

(Common to ECE and EIE)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- What are the applications of Millman's theorem?
 - What is the relation between line voltage and phase voltage in a three phase balanced star connected system?
 - What is back emf in a DC motor?
 - What is residual voltage?
 - What is the significance of conducting OC and SC test on single phase transformers?
 - In a no-load test of a transformer the wattmeter reading gives what type of losses?
 - Draw the slip-torque characteristics of a three-phase induction motor.
 - What is the advantage of slip ring induction motor over other motor?
 - What is the relation between speed and frequency of an alternator?
 - Why the field winding of the alternator is excited with DC current?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

- 2 A balanced star connected load of $(4 + j3) \Omega$ per phase is connected to a balanced 3-phase 400 V supply. The phase current is 12 A. Find (i) The total active power. (ii) Reactive power. (iii) Total apparent power. Derive the formulae used.

OR

- 3 (a) What is the advantage of 3-phase system? Explain in detail.
(b) Three impedances each of $(5 + j12) \Omega$ are connected in star to a 220 V, 3-phase 50 Hz supply. Calculate the line currents

UNIT - II

- 4 (a) Explain the characteristics of DC motor.
(b) Explain various methods to control the speed of DC shunt motor.

OR

- 5 Explain the characteristics of DC generators.

UNIT - III

- 6 (a) Explain the working principle and operation of transformer.
(b) What are the various losses that occur in a transformer? Derive the condition for maximum efficiency of a transformer.

OR

- 7 (a) Derive EMF equation of a transformer.
(b) A 11000/400 V distribution transformer takes a no load primary current of 1 A at a power factor of 0.24 lagging. Find: (i) Core loss current. (ii) Magnetizing current. (iii) Iron loss.

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UNIT – IV

- 8 (a) Derive the expression for maximum torque of 3- phase induction motor.
(b) A 12-pole 3-phase induction motor runs at 485 rpm on a 50 Hz supply. Calculate: (i) the slip and (ii) the frequency of the rotor emf.

OR

- 9 (a) Describe the principle of operation of induction motor and discuss the some of its applications.
(b) A 3-phase induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate: (i) the synchronous speed. (ii) the speed of the motor when slip is 4% and (iii) The rotor current frequency when the motor runs at 600 r.p.m.

UNIT – V

10 Explain the constructional details of synchronous generators.

OR

11 Define regulation. Explain any one procedure to determine regulation with neat diagram.
