

B.Tech II Year I Semester (R15) Regular Examinations November/December 2016

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)

- (a) What is the principle of operation of dc generator?
- (b) Define excitation. What are the methods of excitation?
- (c) What is meant by back emf?
- (d) What are the limitations of Swinburne's test?
- (e) Explain transformer ratings in KVA?
- (f) What is a Transformer?
- (g) What is meant by plugging?
- (h) Define slip.
- (i) Explain about pullout torque?
- (j) What is a synchronous capacitor?

PART – B

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

UNIT – I

2 Explain constructional features and operation of a DC generator.

OR

3 Derive the E.M.F. equation in a dc machine.

UNIT – II

4 Explain various speed control methods of a DC motor with neat sketches

OR

5 The separately-excited dc motor was operated at no-load and the following data were recorded:

$$\omega_m = 1000 \pi/30 \text{ rad/s}, I_a = 0.95 \text{ A}, V_t = 240 \text{ V}, V_B = 150 \text{ V}, R_a = 0.2 \Omega, R_f = 75 \Omega$$

The field voltage (V_B) is unchanged, but the motor is loaded so that it supplies an output power $P_s = 10 \text{ HP}$ at 1000 rpm to a coupled mechanical load. At this load point, determine: (i) The rotational losses. (ii) The armature current. (iii) The terminal voltage. (iv) The efficiency. Neglect armature reaction.

UNIT – III

6 Describe the various losses in a transformer. Explain how each loss varies with the load current, supply voltage and frequency.

OR

7 (a) Find the following parameters:

(i) Active component and reactive components of no-load current.

(ii) No-load current of a 230 V/115 V single-phase transformer if the power input on no-load to the high voltage winding is 70 KW and power factor of no-load current is 0.25 lagging.

(b) The no-load ratio required in a single phase 50 Hz transformer is 6600/300 V. If the maximum value of flux in the core is to be about 0.09 Weber. Find the number of turns in each winding.

Contd. in page 2

UNIT – IV

8 Explain the constructional details and operation of a three phase induction motor.

OR

9 A three phase, 50 Hz, 4-pole slip ring induction motor has a star connected rotor. The full load speed of the motor is 1460 rpm. The rotor resistance and stand still reactance per phase are 0.1 ohm and 1.5 ohm respectively. The open circuit voltage on open circuit between the slip rings is 90 volts. Determine: (i) Percentage slip.

(ii) Induced emf in rotor per phase.

(iii) The rotor reactance per phase at full load.

(iv) The rotor current and full load power factor.

UNIT – V

10 Explain the construction and working of features of a synchronous motor.

OR

11 What is Synchronous Impedance Method and what are the calculations involved in it.

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