

B.Tech II Year I Semester (R15) Regular & Supplementary Examinations November/December 2018

ELECTRICAL TECHNOLOGY

(Common to ECE & EIE)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) What is the role of commutator in DC generator?
 - (b) Define Fleming's right hand rule.
 - (c) What do you mean by auto transformer?
 - (d) Define frequency.
 - (e) What is meant by electromagnetic torque?
 - (f) What is the basic difference between motor and generator?
 - (g) How will you change the direction of rotation of a d.c motor?
 - (h) What is back emf in d.c motors?
 - (i) Define slip and give its expression.
 - (j) Define critical field resistance and explain briefly.

PART – B

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

UNIT – I

- 2 Explain the constructional features and operation of a DC generator with diagram.

OR

- 3 Draw and explain the load characteristics of series, shunt and compound generators.

UNIT – II

- 4 (a) Derive an expression for torque developed in the armature of DC motor.
(b) A separately excited generator when running at 1200 rpm supplies a current of 200 A at 125 V to a circuit of constant resistances. What will be the current when speed drops to 1000 rpm if the field current is unaltered? Armature resistance is 0.04 ohms and the total voltage drop at brushes is 2 V. Ignore the change in armature reaction.

OR

- 5 (a) Deriving the necessary expressions, explain how to predetermine the efficiency of a d.c shunt motor.
(b) A d.c shunt motor takes 1.2A on no-load when connected to a 220 V d.c mains, with an armature resistance of 1.2 ohms when the field current is 0.7 A. Determine the load current corresponding to maximum efficiency of the motor.

UNIT – III

- 6 Draw and explain the constructional features of a single phase transformer. Also discuss its operation with and without load.

OR

- 7 (a) Explain how efficiency of a static machine can be predetermined by suggesting suitable method.
(b) A 2.5 KVA, 230/115 V, transformer has iron losses of 60W and full load copper losses of 120 W. If the power factor of the load is 0.8 p.f lag, calculate: (i) Full load efficiency. (ii) The load at which maximum efficiency occurs and its value.

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R15**UNIT – IV**

- 8 (a) Obtain the condition for maximum torque under running condition in induction motor.
(b) Discuss about the slip torque characteristics of a three phase induction motor.

OR

- 9 Describe construction and principle of operation of 3-phase squirrel cage induction motor.

UNIT – V

- 10 (a) Explain the synchronous impedance method of predetermining efficiency of an alternator.
(b) A 4 KVA, 3 – ϕ , 220 V, 50 Hz, alternator has the following parameters: $R_a = 1.2$ ohms, $Z_s = 2$ ohms. Calculate percentage regulation at 0.9 p.f lag and lead.

OR

- 11 Explain the construction and operation of synchronous motor.

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