

I B. Tech II Semester Supplementary Examinations, March- 2022
BASIC ELECTRICAL ENGINEERING
 (Com. to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

UNIT - I

1. a) Explain the various parts of DC Machine and working principle of DC Generator (8M)
 b) Explain the procedure for conducting the Brake test on DC Shunt motors and what we can achieve from this test. (7M)

Or

2. a) Why is starter necessary for a DC Motor? Explain the working of a three - point starter with the help of a neat diagram (8M)
 b) A four – pole, 500 V, wave – wound dc shunt motor has 900 conductors on its armature. Calculate the speed of the motor if its armature current is 80A, the flux per pole is 20 mWb and armature resistance is 0.12Ω (7M)

UNIT - II

3. a) Explain how the short circuit test on a transformer is to be conducted. What information do you get from the short circuit test data? (8M)
 b) A 110V/ 220V transformer is supplied with 110V, 50 Hz supply to its low voltage side. It is desired to have maximum value of core flux as 4.5 mWb. Calculate the required number of turns in its primary winding. (7M)

Or

4. a) List and explain the various losses that occur in a single phase transformer. (8M)
 b) A 5 KVA, 1000/200 V, 50 Hz single – phase transformer has the following no – load test and the short circuit test data. (7M)
 No – load test conducted at the low voltage side:
 $W_o = 90\text{ W}$; $I_o = 1.1\text{ A}$; $V = 200\text{ V}$
 The short circuit test conducted at the high voltage side:
 $W_{sc} = 160\text{ W}$; $I_{sc} = 5\text{ A}$; $V = 35\text{ V}$
 Calculate the efficiency of the transformer at full load 0.75 power factor lagging.

UNIT - III

5. a) Distinguish between Salient pole and Cylindrical type synchronous machine (8M)
 b) Find the no – load phase and line voltage of a star – connected three phase, 6 – pole alternator which runs at 1200 rpm, having flux per pole of 0.1 Wb sinusoidal distributed. Its stator has 54 slots having double layered winding. Each coil has 8 turns and the coil is chorded by 1 slot. (7M)

Or

6. a) Explain the principle of operation of Synchronous motor (8M)
 b) Find the synchronous impedance and reactance of an alternator in which a given field current produces an armature current of 200 A on short circuit and a generated emf of 50 V on open circuit. The armature resistance of 0.1Ω . To what induced voltage must the alternator be excited if it is to deliver a load of 100 A at a power factor of 0.78 lagging, with a terminal voltage of 220 V (7M)

UNIT - IV

7. a) Derive the torque expression of a three phase Induction motor. (8M)
- b) The power supplied to a three-phase induction motor is 40 kW and the stator losses are 2 kW. If the slip is 4% determine (a) the rotor copper loss, (b) the total mechanical power developed by the rotor, (c) the output power of the motor if frictional and windage losses are 1.48 kW, and (d) the efficiency of the motor, neglecting rotor iron loss. (7M)

Or

8. a) List and explain the advantages of Three phase induction Motors (8M)
- b) Explain the importance of conducting the brake test on a three phase Induction motor and what we can achieve from that test results. (7M)

UNIT - V

9. a) Distinguish between Split phase and Shaded pole induction motors in detail (8M)
- b) Explain the working of AC Servo motor. (7M)

Or

10. List the applications, advantages and disadvantages of Single phase Induction motors. (15M)