Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B. Tech II Year I Semester Supplementary Examinations August-2021
ELECTRICAL MACHINES-I
(Electrical and Electronics Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 60

PART-A
(Answer all the Questions 5 x 2 = 10 Marks)

1	a	What is residual magnetism?	2M
	b	What is Back emf?	2M
	c	Why parallel operation of DC generator necessary?	2M
	d	Draw the phasor diagram of transformer with Capacitive load.	2M
	e	What are the limitations of Shaded Pole Induction Motor?	2M

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	a	Deduce an expression for e.m.f equation of DC Generator.	5M
	b	An 8-pole lap connected armature has 960 conductors, a flux of 40 m Wb per pole and a speed of 400 r.p.m. Calculate the emf generated on open circuit. If the armature were wave connected, at what speed it must be driven to generate 400 V.	5M

OR

3	a	Briefly explain the effects of armature reaction in a DC Generator with neat sketch.	6M
	b	Distinguish between Lap and Wave winding.	4M

UNIT-II

4	a	Explain the principle of operation of a D.C motor. Derive the equation for the torque developed by a D.C. motor.	5M
	b	Draw and explain the characteristics of DC shunt Motor.	5M

OR

5	a	A 25HP, 250V DC Series motor has armature resistance 0.1Ω and field resistance 0.05Ω and brush Contact drop 3V. When the line current is 80A, the speed is 600rpm. Find the speed when the line Current is 100A.	6M
	b	Explain the characteristics of DC series Motor.	4M

UNIT-III

6	a	Explain in detail about the parallel operation of DC series generators.	5M
	b	Enumerate the losses in DC machine.	5M

OR

7	Describe Hopkinson's test in detail. What are its advantages and disadvantages?	10M

UNIT-IV

8	a	Explain the principle of operation of transformer.	6M
	b	Derive the e. m. f. equation of a transformer.	4M

OR

9 a What are the various losses in transformer? How these losses can be minimized? **5M**

   b The No-Load current of a 4400/440 V, 1-Φ, 50 Hz transformer is 0.04 A. It **5M**
      consumes power 80 W at no-load when supply is given to LV side and HV side is
      kept open. Calculate the following: (i) Power factor of no-load current. (ii) Iron loss
      component of current. (iii) Magnetizing component of current.

UNIT-V

10 A 2 kVA, 115/230 V, 50HZ transformer gave the following test results: **10M**
    Short-circuit test: 13 V, 8.7 A, 100 W Open circuit test: 115 V, 1.1 A, 50 W
    Determine (i) the transformer equivalent circuit referred to primary and insert all the values in it.
    (ii) Calculate the voltage regulation and efficiency at full load at 0.8 power factor lagging.
    (iii) Maximum efficiency at 0.8 power factor lagging.

OR

11 Explain working principle of a Shaded Pole Motor. Discuss about its torque-speed **10M**
    characteristics.

END