Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations Feb-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 the function of commutator.	2M
	b	Write the working principle of a DC motor.	2M
	c	Write the condition for maximum efficiency.	2M
	d	Write the Emf equation of a transformer and define each term.	2M
	e	What are the types of 1-Ø Induction Motor?	2M

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

UNIT-I

2	a	What are the various characteristics of compound generators with neat circuit diagrams?	6M
	b	What are the causes for the failure of self-excitation?	4M

OR

3	a	Enumerate all the parts of a DC machine with neat diagram and indicate their functions with neat sketch.	5M
	b	List out the applications of DC Generators.	5M

UNIT-II

4	a	Distinguish between generator and motor action. Derive an equation for the back e.m.f of DC motor?	5M
	b	Determine the torque produced by a 4-pole series motor whose armature has 1200 conductors Connected in wave winding. The motor current is 10A and the flux per pole is 0.02Wb.	5M

OR

5	a	Explain the operation of four-point starter for a DC motor with neat diagram.	6M
	b	List out the applications of DC Motors.	4M

UNIT-III

6	Explain Swinburne's test on DC machine. What are its advantages and disadvantages?	10M

OR

7	A Shunt generator delivers 195A at terminal Voltage of 250V. The armature resistance and shunt Field resistances are 0.02 Ω and 50 Ω respectively. The iron and friction losses equal 950W. Determine (i) EMF generated (ii) Copper losses (iii) output of the prime mover (iv) Commercial, mechanical and electrical efficiencies.	10M

UNIT-IV

8 **a** In a transformer derive the condition for maximum efficiency and find the load current at which the efficiency is maximum. **5M**

b A 20KVA, 2000/200V single phase transformer has the following parameters **5M**
H.V winding:R1=3Ω , X1=5.3Ω.
L.V winding: R2=0.05Ω ,X2=0.1Ω.
Find the Voltage Regulation at **(i)** p.f of 0.8 lagging **(ii)** UPF **(iii)** 0.707 p.f leading

OR

9 **a** Draw the Expression for Voltage regulation of a transformer from the simplified approximate equivalent circuit of 1-Φ transformer and also obtain the condition for zero regulaton. **5M**

b A 10KVA, 2000/400V single-phase transformer has the following data: R1=5Ω, X1=12Ω, R2=0.2 Ω, X2=0.48 Ω. Determine the secondary terminal voltage at full load, 0.8 power factor lagging when the Primary supply voltage is 2000V. **5M**

UNIT-V

10 Discuss how you will perform O.C and S.C tests on a single-phase transformer in the Laboratory with neat circuit diagrams. **10M**

OR

11 Explain the construction and operation of Universal Motor. List out its merits and demerits. **10M**

END