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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations Nov/Dec 2019

ELECTRICAL MACHINES-I

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Write the purpose of the commutator.	**2M**
	b	Define torque.	**2M**
	c	Name the methods of direct and indirect testing.	**2M**
	d	Define a transformer.	**2M**
	e	What are the types of Stepper Motors?	**2M**

PART-B

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

UNIT-I

2	**a**	How demagnetizing and cross magnetizing ampere turns per pole are calculated in a DC Machine?	**5M**
	b	The brushes of a certain lap connected 400kw, 6-pole generator are given a lead of 18^oelectrical. From the data given, calculate (i) the demagnetizing ampere-turns (ii) the cross-magnetizing ampere-turns (iii) series turns required to balance the demagnetizing component. The full load current is 750A and total number of conductors are 900 and the leakage coefficient is 1.4.	**5M**

OR

3		What are the various characteristics of compound generators?	**10M**

UNIT-II

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

OR

5		Explain in detail about the types of D.C motors. Also mention their applications.	**10M**

UNIT-III

6		What do you mean by power stages in a D.C machine? Also explain (i) Electrical efficiency ii) Mechanical efficiency (iii) commercial efficiency.	**10M**

OR

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

UNIT-IV

8	**a**	With relevant phasor diagrams, explain the operation of a practical single phase transformer under no load condition.	**5M**
	b	A 230/2300V transformer takes a no load current of 6.5A and absorbs 187W. If the of primary is 0.06Ω, find (a) Core loss (b) no load power factor (c) active component and (d) magnetizing current.	**5M**

OR

9	**a**	Explain the principle of operation of an transformer.	**5M**
	b	Derive the e. m. f. equation of a transformer.	**5M**

UNIT-V

10 **a** Explain the double revolving field theory and draw the torque speed characteristics. **5M**

b 1-Ø Induction Motor is 4 pole, Output= 410w,Supply voltage=230V,frequency =50Hz, input current =3.2A, power factor=0.7, Speed = 1410 rpm ,Calculate **5M**
i) The efficiency ii) the slip of the motor when delivering rated output.

OR

11 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.

END