Course Code: 1930203 Roll No: MLRS- R19

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION).
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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II B.Tech I Sem Supply End Examination, October 2021
ELECTRICAL MACHINES-I
(EEE)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	Explain the different types of d.c. generators with the help of neat circuit diagrams. Give their voltage current relationships.	7M	CO1	BL4
	b)	Explain magnetization characteristic and Load characteristics of a DC generator?	7M	CO1	BL4
2	a)	What are the causes of sparking in a d. c. machine? Explain how commutation is improved by use of inter poles.	7M	CO1	BL4
	b)	A 250V, 50KW shunt generator has 1000 turns on each pole of its field winding. On no load a current of 3.5A in the field winding produces a terminal voltage of 250V, but on full load the shunt current has to be increased to 5A for the same terminal voltage at the same speed. Calculate number of series field turns per pole required for level compounding.	7M	CO1	BL3
3	a)	Derive the condition for maximum efficiency of DC machine?	7M	CO2	BL5
	b)	A 50 KW, 250 V, 1200 rpm DC motor when tested on no-load at 250V draws an armature current of 13.24A, while its speed is 1215 rpm. Upon conducting other tests it is found that Ra = 0.06 and Rf = 50 Ohms while V_b (Brush voltage drop) = 2V. Calculate the motor efficiency at a shaft load of 50 KW at rated voltage with a speed of 1195 rpm. Assume that the stray loss is 1% of the output. Determine the maximum efficiency of the motor and the load at which it occurs.	7M	CO2	BL3
4	a)	Explain the experimental setup and calculations involved in brake test method to determine the efficiency of DC machine.	7M	CO3	BL4
	b)	The Hopkinson's test on two shunt machines gave the following results for full load. The supply current was 15 A at 200 V. The generator output current was 85A. The field currents for motor and generator were 2.5 A and 3 A respectively. The armature resistance of each machine was 0.05ohms . Find the efficiency of each of the machines under the above loading conditions.	7M	CO3	BL3
5	a)	Explain the working principle of 3-point starter with the help of a neat diagram.	7M	CO2	BL4
	b)	How to calculate the efficiency of a DC shunt motor by using swinburnes test.	7M	CO3	BL1
6	a)	Derive the EMF equation of a single-phase Transformer	7M	CO4	BL5
	b)	The maximum efficiency of 50 KVA transformer is 97.4 % and occurs at 90 % of the full load. Calculate the efficiency of transformer at (i) Full load 0.8 power factor lagging (ii) Half full load 0.9 power factor	7M	CO4	BL3
7	a)	Define efficiency and regulation of a transformer. Show how the power factor affects both of them.	7M	CO4	BL3
	b)	Explain the procedure to determine the equivalent circuit parameters from O.C. and S.C. test on single phase transformer.	7M	CO5	BL4
8	a)	Explain the necessary conditions for parallel operation of two transformers. Also discuss about the effects of unequal voltages in parallel operation.	7M	CO5	BL4
	b)	Briefly explain various connections of three phase transformers and give the line-to-line and line-to-neutral voltage and current relationships on both the sides.	7M	CO5	BL4

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