



TKRCET
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R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

Subject code: 3P3BD

B.Tech III Semester Supplementary Examinations, February 2024 Electrical Machines-I

(EEE)

Maximum Marks: 70

Date: 23.02.2024 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10X2M=20 Marks)

		CO	Bloom Tx
1	Write the function of commutator?	CO1	L1
2	Differentiate lap and wave windings.	CO1	L2
3	What is back EMF?	CO2	L1
4	Define Armature reaction	CO2	L1
5	What are stray losses?	CO3	L1
6	List out few salient points of indirect test of DC motors	CO3	L4
7	What are eddy current losses. Write an expression for eddy current losses	CO4	L1
8	Define efficiency of a transformer	CO4	L1
9	List out few advantages of single-phase auto transformer	CO5	L3
10	Discuss the advantages of a single 3-phase transformer over three single phase transformers connected to act as a single 3-phase transformer	CO5	L1

Part-B

Answer All the following questions.

(5X10M=50Marks)

11	(a) Discuss the principle of operation of DC generator (b) A dc machine has 8 pole, lap connected armature with 960 conductors and flux per pole is 40mWb. Calculate the generated EMF if it is driven at 400 rpm. Calculate the speed of the machine to generate a voltage of 400V, if the lap wounded armature is replaced by wave winding	5M 5M	CO1	L2
OR				
12	(a) Derive an expression for emf induced in DC generator. (b) Give the classification of DC generators along equivalent circuits and generated voltage expressions.	5M 5M	CO1	L3 L1
13	(a) Explain speed control of DC motors by armature voltage method? (b) A DC motor takes an armature current of 100A at 480V. The armature circuit resistance is 0.2Ω. The machine has 6poles and lap wound armature with 864 conductors. The flux per pole is 50mWb. Calculate speed and torque developed in the armature	5M 5M	CO2	L2

	OR			
14	Explain the working of 4-point starter with neat sketch	10M	CO2	L2
15	(a) Explain the different losses occurring in a DC machine (b) Discuss the salient points of brake test	5M 5M	CO3	L2
	OR			
16	Find the efficiency at full load and half load for a 1000 kW, 600V shunt generator using the following data Armature resistance = 0.006Ω , mechanical and iron losses at rated speed = 24kW shunt field resistance = 50Ω brush contact drop = 1V per brush stray load losses = 1% of output	10M	CO3	L1
17	(a) A single phase transformer is connected to a 230V, 50Hz supply. The net cross sectional area of the core is 60cm^2 . The number of turns in the primary is 500 and in the secondary 100. Determine (i) Transformation ratio (ii) Maximum value of the flux density in the core	10M	CO4	L2
	OR			
18	(a) Explain the construction of 1-phase transformer. (b) Derive EMF equation of single-phase transformer?	5M 5M	CO4	L1 L3
19	The following readings were obtained from OC and SC tests on 8 KVA, 400/120V and 50 Hz transformer. OC Test (Lv side): 120V, 4A and 75W SC Test (Hv side): 9.5V, 20A and 110W (i) Obtain equivalent Circuit of the transformer (ii) Voltage regulation and efficiency at 0.8 power factor lagging load and Efficiency at Half full load and 0.8 power factor load.	10M	CO5	L3
	OR			
20	(a) What is auto transformer. Compare its merits and de merits over single phase transformer. (b) Discuss the parallel operation of transformers with unequal voltages.	5M 5M	CO5	L1 L2