



R22 Regulation

Subject code: 4E3BD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Regular Examinations, February 2024

ELECTRICAL MACHINES-I

(EEE)

Maximum Marks: 60

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 10 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		CO	Bloom Tx
All the following questions carry equal marks (10x1M=10 Marks)			
1.a)	Differentiate between lap and wave windings?	CO1	BL1
b)	An 8-pole wave connected armature has 300 conductors and runs at 800 rpm. Determine the useful flux / pole if the electromotive force generated on open circuit is 500V.	CO1	BL3
c)	Define back emf	CO2	BL2
d)	Define efficiency of dc machine and give its losses?	CO2	BL2
e)	What are the limitations of field's test?	CO3	BL1
f)	What are the advantages and disadvantages of Swinburne's Test?	CO3	BL2
g)	Define All day efficiency	CO4	BL2
h)	What is the difference between core-type and shell-type transformer?	CO4	BL2
i)	Define energy efficiency and voltage regulation of transformer.	CO5	BL2
j)	What is the function of Auto Transformer	CO5	BL1
Part-B			
Answer All the following questions. (5X10M=50Marks)			Bloom Tx
2	Discuss in detail the load characteristics of DC Series and Shunt generators. [10M]	CO1	BL4
OR			
3	a) What do you understand from the term armature reaction? Describe the role of compensating windings in a DC generator? [5m] b) Derive an emf equation of a DC generator [5m]	CO1	BL3
4	a) Draw and explain the various characteristics of DC series motor. [5m] b) Draw and explain the 3-point starter along with protective devices. [5m]	CO2	BL3
OR			
5	a) Derive the torque equation of a DC Motor. [5m] b) A 250V shunt motor runs at 1000 rpm at no load and takes 8A. The total armature and shunt field resistances are 0.2 and 250 ohms respectively. Calculate the speed when loaded and taking 50A. Assume the flux to be constant. [5m]	CO2	BL3 BL4
6	Describe how you find the efficiency of dc motor using Brake test. What are	CO3	BL2

	its disadvantages? [10m]		
	OR		
7	With a neat sketch, explain the procedure of Hopkinson's Test? Mention its advantages and disadvantages. [10m]	CO3	BL3
8	Discuss the working principle of single-phase Transformer and also explain the constructional details. [10m]	CO4	BL3
	OR		
9	a) From the fundamentals, develop the exact equivalent circuit of a Transformer. [5m] b) A single phase 50Hz transformer has 100 turns on the primary and 400 turns on the secondary winding. The net cross sectional area of core is 250cm^2 . If the primary winding is connected to a 230V, 50Hz supply, determine: i) The EMF induced in the secondary winding ii) The maximum value of flux density in the core. [5m]	CO4	BL3 BL3
10	Explain about OC and SC test on single phase transformer with a neat sketch [10m]	CO5	BL3
	OR		
11	a) Explain the effect of third harmonics in phase voltages of three phase transformers. [5m] b) A 3-phase transformer bank consisting of three 1-phase transformers is used to step-down the voltage of a 3-phase, 6600V transmission line. If primary line current is 10Amp, calculate the secondary line voltage, line current and output KVA for the following connections. i. Y/ Δ and ii. Δ /Y. The turn's ratio is 12. Neglect losses. [5m]	CO5	BL3 BL3