



*R20 Regulation* *Subject code: 3P3BD*  
**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**  
 (Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech III Semester Supplementary Examinations, December 2024**

**ELECTRICAL MACHINES-I**  
**(Electrical and Electronics Engineering)**

**Maximum Marks: 70**

Date: 09.12.2024

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 which carries 10M.
  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	State Faraday's laws of Electromagnetic Induction.	1	L1
2	State Fleming's right hand rule	1	L1
3	What is back emf in DC motor?	2	L1
4	List the different losses in a dc machine.	2	L1
5	Give Brief account on field test on DC machine	3	L1
6	What is Back EMF ? Explain its significance	3	L1
7	Define self and mutual induced emf.	4	L1
8	Define voltage regulation of transformer	4	L1
9	Define Auto Transformer, Turns ratio?	5	L1
10	What are non-linearities in transformer core?	5	L1

**Part-B**

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Explain the construction details of a DC machine with neat sketches. [10M]	1	L3
	OR		
12	Explain the process of commutation in DC machine. [10M]	1	L3
13	The armature of a 4-pole DC motor has a lap connected winding accommodated in 60 slots, each containing 20 conductors. If the useful flux per pole is 25mwb. Calculate the torque developed when the armature current is 60A. [10M]	2	L3
	OR		
14	Draw the following characteristics in case of DC series motor [10M] a) Speed(N) Vs Armature current ( $I_a$ ) b) Torque (T) Vs Armature current ( $I_a$ ) c) Speed (N) Vs Torque(T)	2	L3
15	Explain how the stray losses in a DC motor are separated. [10M]	3	L3
	OR		

16	Conduct Hopkinson's test on the DC machine and give relevant formulae. [10M]	3	L3
17	Give the constructional details of the Transformer and explain its working. [10M]	4	L3
OR			
18	Derive the EMF equation of the transformer. Derive the condition for the maximum efficiency of the transformer? [10M]	4	L3
19	Write down the differences between three phase bank transformer and single unit transformer. [10M]	5	L3
OR			
20	Explain about auto-transformer with a neat sketch and give its applications. [10M]	5	L3