H.T No: | | | | | | | | | | | **R18** **Course Code: A30203**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Electrical Machines-I

(Electrical & Electronics Engineering)

Date: 15.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Distinguish between linear and nonlinear magnetic circuits.	2 M
2.	What is meant by 'stored energy' in a magnetic circuit?	2 M
3.	Explain what armature reaction means in a DC machine.	2 M
4.	Distinguish between lap and wave windings in DC machines.	2 M
5.	Describe what is meant by "critical field resistance" in a shunt generator.	2 M
6.	What is the difference between a separately excited and a shunt DC generator?	2 M
7.	Why is parallel operation of transformers necessary in power systems?	2 M
8.	Describe the principle of operation of a transformer.	2 M
9.	Differentiate between no-load and on-load tap changers.	2 M
10.	Describe what is meant by "no-load tap-changing" in transformers.	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Explain the B-H curve in detail and discuss its significance in magnetic material selection for electromagnetic applications.	10M
	OR	
11. B).	Explain the concept of torque as derived from stored magnetic energy in rotating machines and its applications in electromechanical devices.	10M
12. A).	Derive the torque equation for a DC machine and discuss how torque generation is related to the armature current.	10M
	OR	
12. B).	Discuss the concept of armature reaction and its effect on air gap flux density distribution in DC machines.	10M
13. A).	Explain the torque-speed characteristics of DC motors. Derive the relationship between torque, armature current, and speed.	10M
	OR	
13. B).	Illustrate and analyze the open circuit characteristic (OCC) of a separately excited DC generator.	10M
14. A).	Explain the open circuit and short circuit tests for single-phase transformers.	10M
	OR	
14. B).	A250 kVA, 11000/415 volts 50 Hz transformer has 80 turns on the secondary. Determine i) Rated primary and secondary currents, ii) Number of primary turns, iii) Maximum value of flux in the core and iv) Voltage induced /turn on secondary.	10M

(P.T.O..)

15. A). Explain the types of cooling methods used in transformers. Compare different cooling techniques. 10M

OR

15. B). Explain the construction and working principle of three-phase transformers. 10M

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