

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER - 2024**

DC MACHINES AND TRACTION MOTORS

[Maximum Marks : 75]

[Time : 3 hours]

PART-A

I. Answer **all** the following questions in one word or sentence. Each question carries 1 mark.

(9x1=9 marks)

		Module Outcome	Cognitive level
1	An Electrical Generator is a machine which converts Energy into Energy.	M1.02	R
2	Number of Parallel Paths in a Lap Wound DC Generator are.....	M1.04	R
3	The OCC of a DC Generator is also called its..... characteristics.	M2.03	R
4	Equalising Connections are required when paralleling two Generators.	M2.04	R
5	Voltage Equation of DC Motor is	M3.01	R
6	Two Point Starters are used forMotors.	M3.03	R
7	DC.....Motors should not be started on No Load.	M3.02	R
8	In.....Braking, the Motor Energy is returned to Supply Mains.	M4.04	R
9	The Speed Control Method used to obtain the speed above Base Speed in DC Motor is	M4.01	R

PART B

II. Answer **any Eight** questions from the following. Each question carries 3 marks.

(8x3=24 marks)

		Module Outcome	Cognitive level
1	Define Faradays Law of Electromagnetic Induction.	M1.02	R
2	Compare Lap and Wave Windings in DC Machines.	M1.04	U
3	State eddy current loss and write the method to reduce the Eddy Current Loss in a DC Machine.	M1.01	R
4	Define the use of Compensating Winding in DC Generators.	M2.01	R
5	List the necessary conditions for the Parallel Operation of DC Generators.	M2.04	R
6	State the significance of Back EMF in a DC Motor.	M3.01	R
7	Derive the General Torque Equation of DC Motor.	M3.01	U
8	Draw and Label the Three Point Starter.	M3.03	R
9	Explain the Series Parallel Speed Control of DC Traction Motor.	M4.03	U
10	Define Rheostatic Braking in Traction Motors.	M4.04	R

PART C

Answer **all** questions from the following. Each question carries 7 marks.

(6x7=42marks)
Module Outcome Cognitive level

III	Derive the EMF Equation of DC Generators.							M1.03	U	
OR										
IV	Illustrate the Essential Parts of a DC Machine in a Schematic Diagram and Explain their functions.							M1.01	U	
V	Field Current(I)	0	0.5	1	1.5	2	2.5	3	M2.03	A
	O.C. Voltage(V)	5	50	85	102	112	116	120		
<p>The Magnetization characteristic for a 4 Pole, 110 V, 1000 rpm shunt generator is as follows.</p> <p>Armature is Lap connected with 144 conductors. Field Resistance is 45 ohms. Determine</p> <p>(i) The voltage the machine will build up at No Load.</p> <p>(ii) The Critical Resistance.</p>										
OR										
VI	Develop the Open Circuit Characteristics of DC Shunt Generator.							M2.02	A	
VII	Illustrate the Armature Reaction and its effects in DC Generators.							M2.01	U	
OR										
VIII	Illustrate the External Characteristics of DC Shunt Generator.							M2.03	U	
IX	A 250 V shunt motor runs at 1000 rpm at No Load and takes 8 A. The total armature and shunt field resistances are respectively 0.2 ohm and 250 ohm. Calculate the speed when loaded and taking 50 A. Assume the flux to be constant.							M3.01	A	
OR										
X	Develop the Electrical and Mechanical Characteristics of DC Series Motor.							M3.02	A	
XI	Explain Swinburne's Test on DC Motors.							M3.04	U	
OR										
XII	Explain the Applications of DC Motors.							M3.02	U	
XIII	Explain the Speed Control of DC Series Motor by Flux Control Method.							M4.01	U	
OR										
XIV	Summarize the factors affecting speed of DC Motors.							M4.01	U	
