Code No: 123BZ

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, April/May - 2023
ELECTRICAL MACHINES - I
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

1.a)	What is electromagnetic energy?	[2]
b)	Give expression for cohesive force in a singly excited magnetic field system.	[3]
c)	How can we find direction of induced EMF in a d.c. generators?	[2]
d)	Distinguish between d.c.series and d.c. shunt generators.	[3]
e)	Draw the circuit diagram long shunt d.c. generator.	[2]
f)	Draw the load characteristics of d.c. shunt generator.	[3]
g)	What is cross magnetization effect?	[2]
h)	What is NVC and OLR in 3-point starts? Give its significance.	[3]
i)	When is maximum efficiency obtained in a D.C. Machine?	[2]
j)	List the constant losses in a D.C. Machine.	[3]

PART - B

(50 Marks)

2.a)	Derive an expression for torque and energy in a multi excited system.	
b)	Derive expression for energy in a single excited system.	[5+5]
	OR	
3.a)	Derive an expression for single excited system for co energy.	
b)	Draw the diagram for energy balance for multi excited system.	[5+5]
4.a)	Give the function of each part of a D.C. Machine.	
b)	What is De magnetization and cross magnetization effect in D.C.Generators?	[4+6]
	OR	
5.a)	Derive EMF equation of a D.C. Generator.	
b)	A D.C. Generator has a wave wound armature with 225 slots and 2 conductors/slot. If the flux/pole is 0.5 webers and rotates at a speed of 1500 rpm find the induced emf. If no op poles are 4.	[6+4]
6.a)	What is critical resistance and critical speed?	
b)	Explain the procedure to find critical speed and resistance of a given generator.	[4+6]
	OR	
7.a)	Draw the OCC characteristics of a D.C Shunt and series generators.	
b)	What are the necessity conditions for parallel operation of d.c generators?	[6+4]

8.a) Derive expression for Back EMF from fundamentals.
b) Can we control the speed of a d.c.series motor? Suggest suitable methods. [4+6]

OR

9.a) Explain with neat diagram the working of a 4 Point Starter.
b) Give applications of Long shunt and short shunt motors. [6+4]

10.a) Explain In direct method of testing D.C.Machines.
b) Is Brake test direct or indirect method of testing? Justify. [6+4]

OR

11.a) Explain the procedure of conducting Hopkinson's test an d.c. shunt machines.
b) How do you separate stray losses in a d.c. motor set? [5+5]

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