Reg. No.												

Question Paper Code	11691

B.E./B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Third Semester

Electrical and Electronics Engineering

20EEPC302 - DC MACHINES AND TRANSFORMERS

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level,CO
1.	Distinguish between statically and dynamically induced EMF.	2,K2,CO1
2.	Give any four examples for single excited magnetic system.	2,K2,CO1
3.	On what occasion DC generator may not have residual flux?	2,K2,CO2
4.	Define the term 'Armature reaction'.	2,K1,CO2
5.	Write the importance of Back emf in DC motor.	2,K2,CO3
6.	Mention any four applications of DC series motor based on its characteristics.	2,K2,CO3
7.	What is the necessity of starter in DC motor?	2,K2,CO4
8.	Enumerate the factors on which speed of DC motor depends.	2,K2,CO4
9.	Full load copper loss in a transformer is 1600 watt. What will be the loss at half load?	2,K2,CO5
10.	Define all day efficiency of a transformer.	2,K1,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	The total core loss of a specimen of silicon steel is found to be 1500 W at 50 Hz. Keeping the flux density constant the loss becomes 3000 W when the frequency is raised to 75 Hz. Calculate the hysteresis and eddy current losses at each of frequencies separately. Also Suggest the suitable methods to reduce core losses.	13,K2,CO1
		OR	
	b)	Derive an expression for energy and force in Attracted armature type relay magnetic system.	13,K2,CO1
12.	a)	Explain the construction and working principle of DC generator and derive its EMF equation.	13,K2,CO2
		OR	

b) Explain the different methods of excitation and characteristics of DC generators with neat sketch. *13,K2,CO2*

13. a) (i) Explain the types of DC motor with its circuit model. *6,K2,CO3*
(ii) Derive the torque equation of DC motor and write the factors influencing the shaft torque. *7,K2,CO3*

OR

b) Explain the electrical and mechanical characteristics of DC motors. *13,K2,CO3*

14. a) Based on the factors influencing the speed of DC motor, classify the speed control methods. Explain the speed control methods of DC shunt motor with neat diagram. *13,K2,CO4*

OR

b) With neat sketch, Explain how the efficiency of DC shunt motor is predetermined using swinburne's test. *13,K2,CO4*

15. a) Draw the equivalent circuit of a transformer and derive the components with respect to primary side. *13,K2,CO5*

OR

b) Explain the operation of auto transformer and Prove that amount of copper saved in auto transformer is (1 – K) times that of ordinary transformer. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) (i) A separately excited DC generator, when running at 1000 rpm supplied 200A at 125 V. What will be the load current when speed drops to 800 rpm, if field current is unchanged? Given that the armature resistance=0.4 Ω and brush drop=2V. *8,K2,CO2*

(ii) A 6 pole, 400V DC shunt motor has 720 wave connected conductors on its armature. The full load armature current is 60A and flux per pole is 0.021 wb. Calculate the full load speed if the motor armature resistance is 0.3 Ω and the brush drop is 1V per brush. *7,K2,CO3*

OR

b) A transformer has its maximum efficiency of 0.98 at 15 KVA at UPF. During the day it is loaded as follows *15,K2,CO5*

12 hours 2 KW at 0.5 pf
6 hours 12 KW at 0.8 pf
6 hours 18 KW at 0.9 pf

Find the All-day efficiency.