



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.																			
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Make Up Examinations – December 2025

Date: 26 – 12- 2025

Time: 9:30am – 12:30pm

School: SOE	Program: B.Tech-EEE		
Course Code : EEE2024	Course Name: Electrical Machines-I		
Semester: MK	Max Marks: 100	Weightage: 50%	

CO - Levels	C01	C02	C03	C04	C05
Marks	19	19	25	25	--

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Write the EMF equation in a dc generator and Identify the parameters on which the generated EMF depends on?	2 Marks	L1	C01
2.	Compare the Carbon & Copper brushes, Suggest the reliable one?	2 Marks	L1	C01
3.	Write the statement of Lenz's Law and justify how it will be helpful to understand back emf of the motor?	2 Marks	L1	C02
4.	Draw the characteristics of DC Shunt motor and list out the industrial applications ?	2 Marks	L1	C02
5.	What are parameters that can be computed from S.C. Test of a Transformer?	2 Marks	L1	C03
6.	The voltage of a transformer has a proportional relationship with frequency. The three common frequencies available are 50Hz, 60Hz and 400Hz. European power is typically 50Hz while North American power is usually 60hz. The 400 Hz is reserved for high-powered applications such as aerospace and some special-purpose computer power supplies and hand-held machine tools. If the same transformer is used for the above mentioned, frequencies, What would happen to the Iron Losses?	2 Marks	L1	C03
7.	What are parameter that can be computed from O.C. Test of a Transformer?	2 Marks	L1	C03

8.	What is the purpose of Scott Connection and what would be the phase angle between secondary voltages of main and teaser transformer	2 Marks	L1	C04
9.	Mention the applications of Scott Connection and Comment on the tapping positions of transformers.	2 Marks	L1	C04
10.	Write down the Line to Line and Phase Voltage relationships in case of STAR to DELTA connections?	2 Marks	L1	C04

Part B

Answer the Questions.

Total Marks 80

11.	a. Derive an expression for the EMF Equation of DC Generator	7 Marks	L1	C01
	b. The lap wound armature has a 4-pole generator has 51 slots. Each slot contains 20 conductors. Compute the emf generated in machine when driven at 1500 rpm. If useful flux per pole is 0.01 Wb?	8 Marks	L1	C01

or

12.	a. A four pole lap wound shunt generator supplies 60 lamps of 100W, 240V each; the field and armature resistances are 55ohm and 0.18ohm respectively. If the brush drop is 1volt for each brush Compute (i) armature current (ii) current per path (iii) generated emf (iv) power output of dc machine.	15 Marks	L2	C01
-----	---	-------------	----	-----

13.	a. Two single phase electric furnaces A and B are supplied at 220V from a three phase 1100V supply by means of a Scott connected transformer combination. If the total output is 600kW at 0.6 power factor lagging. I) Compute the currents in the primary and secondary and transformation ratio of each transformer. Draw the relevant circuit diagrams too. II) Comment on value of transformation ratio, if the tapping is at 75% in teaser transformer.	25 Marks	L3	C04
-----	--	-------------	----	-----

or

14.	a. A three phase step down transformer takes 15A when connected to 4400V mains. The turns ratio per phase is 10. Neglecting losses Compute the the secondary line voltage , line current and the output of the transformer if the windings are connected in (i) delta/delta (ii) delta/star (iii) star/delta (iv) star/star.	25 Marks	L2	C04
-----	--	-------------	----	-----

15.	a. The emf per turn of a single phase, 6.6 kV/440 V, 50Hz Transformer is approximately 10V. Calculate the number of turns in the HV and LV windings and the net cross sectional area of the core for a maximum flux density of 1.6 T.	15 Marks	L2	C03
	b. 500 KVA Transformer has a core loss of 2200 watts and a full load copper loss of 7500 watts. If the power factor of the load is 0.90 lagging, Evaluate the full load efficiency and the KVA load at which maximum efficiency occurs.	10 Marks	L2	C03

Or

16.	a.	Obtain the equivalent circuit of a 200 / 400 V, 50 Hz, 1 phase transformer from the following test data: O.C. test: 200 V, 0.7 A, 70 W – on L.V side. S.C. test: 15 V, 10 A, 85 W – on H.V side.	25 Marks	L2	C03
------------	-----------	--	---------------------	-----------	------------

17.	a.	A 400 Volts DC Shunt Motor has a no load speed of 1450 RPM, the line current being 9 Amperes. At full loaded condition, the line current is 75 Amperes. If the shunt field resistance is 200 Ohms and armature resistance is 0.5 Ohm. Evaluate the full load speed.	15 Marks	L2	C02
------------	-----------	---	---------------------	-----------	------------

Or

18.	a.	A 440 V D.C. shunt motor takes 4A at no load. Its armature and field resistances are 0.4 ohms and 220 ohms respectively. Estimate the kW output and efficiency when the motor takes 60A on full load.	15 Marks	L2	C02
------------	-----------	---	---------------------	-----------	------------