QP Code: RD21BTECH057 | Reg. No | | | | | | | | | | | AR 21

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester - Regular) Examinations, December – 2022

21BELPC23001/21BEEPC23001– Electrical Machines – I

(EE & EEE)

Time: 3 hrs | Maximum: 70 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Explain the function of Commutator in a DC machine?	CO 1	1
b. What is the use of laminated armature?	CO 1	1
c. Draw the circuit diagram of DC shunt motor and identify the currents in it?	CO 2	2
d. Write any two differences of practical transformer and ideal transformer?	CO 3	2
e. What is Transformation Ratio?	CO 4	2

PART – B **(15 x 4 = 60 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. Derive the EMF equation of DC machine	8	CO 1	2
b. A 4 pole lap wound DC shunt generator has a useful flux /pole 0.06 wb and number of conductors are 500. The armature resistance is 0.0375 ohm. Calculate the terminal voltage when running at 1500 rpm. If armature current is 40 A.	7	CO 1	3
(OR)			
c. Explain about the working of 3-point starter	8	CO 1	2
d. What is the significance of residual magnetism? Explain the experimental determination of OCC?	7	CO 1	2
3.a. Explain the operation of DC motor with neat diagram?	8	CO 2	2
b. A 6-pole lap connected 200 V shunt motor has 400 armature conductors. It takes 41 A on full load. The flux per pole is 0.05 wb. The armature and field resistances are 0.1 ohm and 200 ohms respectively. Contact drop per brush = 1V. Determine the speed of the motor at full load.	7	CO 2	3
(OR)			
c. Explain the methods of speed control of DC motor	8	CO 2	3
d. Explain the causes for failure to self-excitation of a DC machine with its remedial measures?	7	CO 2	2
4.a. Enumerate the differences between Auto Transformer with Two Winding Transformer	8	CO 3	2
b. A 40 KVA, 1000/100V, single phase, 50Hz transformer has a primary resistance of 4.5 ohm and reactance of 6.5ohm. The secondary resistance and reactance are 0.025ohm and 0.04ohm respectively. Find Equivalent resistance, reactance and impedance referred to secondary.	7	CO 3	3
(OR)			

c.	A 4KVA, 400/200V, 50 Hz single-phase transformer has the following test data: OC test (LV side): 200V, 1A, 64W SC test (HV side): 15V, 10A, 80W Determine equivalent circuit referred to primary side	8	CO 3	3
d.	For the above problem (4C) find the efficiency of the transformer at 0.8 pf lagging.	7	CO 3	3
5.a.	Derive the EMF equation of a Transformer	8	CO 3	2
b.	A 40 KVA, single phase transformer has 400 turns on the Primary and 100 turns on the secondary. The primary is connected to 2000V, 50Hz supply. Determine i) the secondary voltage on open circuit. ii) The maximum value of flux	7	CO 3	3
	(OR)			
c.	Explain the differences between Shell type transformer and core type transformer	8	CO 4	2
d.	Explain the constructional features of 3-phase transformer with its advantages and disadvantages.	7	CO 4	2

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