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ACE
Engineering College
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Question Paper Code:

EE304PC

ACE-R20

Semester End Examination
II B. Tech- I Semester- MARCH-2022
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

Time: 3 Hours

Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1. a)	Differentiate between lap and wave windings	4
b)	Calculate the flux in a 4 pole dynamo with 722 armature conductors generating 500V when running at 1000 rpm when the armature is i) Lap winding ii) Wave winding	10
2. a)	Explain in detail about the armature reaction and further list the effects of armature reaction.	10
b)	Explain the purpose of using compensating windings in DC machines	4
3. a)	Draw and explain the Electrical characteristics of DC series and shunt motor.	7
b)	Derive the expression for the speed of a DC motor in terms of back emf and flux per pole.	7
4. a)	Derive the Torque equation of a DC motor	7
b)	A 240V four pole DC shunt motor has wave type armature winding with 500 conductors. The armature circuit resistance is 0.22 ohms, field resistance is 150 ohms and flux per pole is 0.02 Webers. Neglect armature reaction. Determine speed and torque developed if the motor draws 16A from the mains	7
5.	Describe the brake test on DC motor to determine the performance characteristics of DC motor	14
6. a)	From the fundamentals, develop the exact equivalent circuit of a Transformer.	7
b)	A single phase 50Hz transformer has 100 turns on the primary and 400 turns on the secondary winding. The net cross sectional area of core is 250cm ² . If the primary winding is connected to a 230V 50Hz supply, determine: i) The EMF induced in the secondary winding ii) The maximum value of flux density in the core.	7
7. a)	Define all day efficiency. Derive the expression for all day efficiency.	7
b)	The voltage per turn of a single phase transformer is 1.1V. When the primary	7

	winding is connected to a 220V, 50Hz A.C supply, the secondary voltage is found to be 550V. Find: i) Primary and Secondary turns ii) Core area if the maximum flux density is 1.1 wb/m^2 .	
8. a)	Explain the effect of third harmonics in phase voltages of three phase transformers.	7
b)	A 3-phase transformer bank consisting of three 1-phase transformers is used to step-down the voltage of a 3-phase, 6600V transmission line. If primary line-current is 10Amp, calculate the secondary line voltage, line current and output KVA for the following connections. i. Y/ Delta and ii. Delta/Y. The turn's ratio is 12. Neglect losses.	7