Q. Code:820634

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Third-Semester

EE18303 – ELECTRICAL MACHINES I

(Electrical and Electronics Engineering)

(Regulation2018/2018A)

TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Analyze a magnetic circuit and determine the performance parameters.	**4**
CO 2	Compute the performance parameters of a transformer and understand the function of the various special transformers.	**3**
CO 3	Derive the force and torque of an electro-mechanical conversion device and analyze the performance.	**3**
CO 4	Derive the characteristics and estimate the performance of DC generators.	**4**
CO 5	Understand the necessity of Starting, controlling, braking, and the performance of different types of DC motors.	**4**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	A coil carrying 500 turns gives rise to a flux 0f 1000 μwb when carrying a certain current. If this current is reversed in $1/10^{th}$ of a second, Find the average emf induced in the coil.	**1**	**3**
2.	Discuss in brief the stacking factor.	**1**	**3**
3.	Full load copper loss in a transformer is 1200 W. Find the copper loss at half load.	**2**	**2**
4.	Interpret the Inrush current in a transformer.	**2**	**3**
5.	Discuss why the practical energy conversion devices use the magnetic field as a coupling medium rather than an electric field.	**3**	**3**
6.	List the examples of the singly excited and doubly excited systems.	**3**	**2**
7.	Discuss the effect of armature reaction on the terminal voltage of a DC shunt generator.	**4**	**2**
8.	Write down the conditions under in which a DC shuntgenerator fails to excite.	**4**	**2**
9.	Which method is preferred for controlling the speed of DC shunt motor at above the rated speed? Justify.	**5**	**2**
10.	Explain why Swinburne's test cannot be performed on DC Series Motor.	**5**	**3**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	A iron ring of circular cross section 10 cm^2 and mean circumference 30 cm has an air gap 2 mm. if the ring is wound with 500 turns, find the exciting current to establish a flux of 0.4 mwb in the air-gap. The relative permeability of iron may be assumed to be 2500.	**(14)**	**1**	**4**
	(OR)			
(b)	Examine the typical B-H Curve and hysteresisloops and explain its Concept.	**(14)**	**1**	**4**
12. (a)	Develop the equivalent circuit of a single phase transformer referred to primary.	**(14)**	**2**	**3**
	(OR)			
(b)	Explain the back to back method of testing for twoidentical single phase transformers.	**(14)**	**2**	**3**
13. (a)	Explain the concept of rotating MMF waves in ACMachines.	**(14)**	**3**	**3**
	(OR)			
(b)	With neat sketch explain multiple excited magnetic field system in electromechanical energy conversion systems. Also obtain the expression for field energy in the system.	**(14)**	**3**	**4**
14. (a)	Explain the main parts of a DC generator and derive an expression for the EMF equation of a DC Generator.	**(14)**	**4**	**4**
	(OR)			
(b)	Explain the different methods of excitation and the characteristics of a DC Generator with suitable diagram.	**(14)**	**4**	**4**
15. (a)	Discuss why the starting current is high at the moment of starting a DC Motor? With a neat sketch, explain about the three point starter required to start the DC Shunt Motor.	**(14)**	**5**	**4**
	(OR)			
(b)	Explain the construction, principle, working and equivalent circuit of a PMDC Motor.	**(14)**	**5**	**4**

PART- C(1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	A 400 Volts DC Shunt Motor has a no load speed of 1450 rpm, the line current being 9. At full loaded condition, the line current is 75. If the shunt field resistance is 200 Ω and armature resistance is 1 Ω. Evaluate the full load speed.	**(10)**	**5**	**5**

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