Q. Code:518573

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

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

Fourth Semester

EE18403 – ELECTRICAL MACHINES II

(Electrical and Electronics Engineering)

(Regulation 2018/2018A)

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

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Determine the performance parameters of a 3 phase induction motor by suitable tests.	**3**
CO 2	Evaluate different types of starters and classify the speed control schemes of 3 phase induction motors.	**4**
CO 3	Characterise different types of single phase induction motors and special machines.	**3**
CO 4	Predict the regulation of an alternator by different methods.	**4**
CO 5	Describe the operation and characteristics of synchronous motors.	**4**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Classify the two types of 3-phase induction motor.	**1**	**2**
2.	A 3-phase induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate the speed at which the magnetic field of the stator is rotating.	**1**	**2**
3.	List the advantages of V/F speed control of an induction motor.	**2**	**2**
4.	Compare Plugging and Dynamic braking	**2**	**2**
5.	Distinguish the terms rotating and pulsating magnetic fields.	**3**	**2**
6.	Specify the use of single-phase induction motor.	**3**	**2**
7.	Mention the winding factors of an alternator.	**4**	**2**
8.	Write the expression of generating EMF in alternators.	**4**	**2**
9.	Why a 3-phase synchronous motor will always run at synchronous speed?	**5**	**2**
10.	What is Synchronous condenser?	**5**	**1**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Describe the construction and working principle of three phase induction motor.	**(14)**	**1**	**3**
	(OR)			
(b)	Sketch and Explain the torque slip characteristics of 3 phase cage and slip	**(14)**	**1**	**3**

ring induction motors. Show the stable region in the graph.

12. (a)	Describe why starters are necessary for starting 3-phase induction motors? Name the different types of starters and explain DOL Starter.	**(14)**	**2**	**3**
	(OR)			
(b)	Explain the different methods of slip power recovery schemes with neat circuit diagram.	**(14)**	**2**	**3**
13. (a)	Describe the no-load test and blocked rotor test for obtaining the equivalent circuit parameters of a single phase induction motor.	**(14)**	**3**	**3**
	(OR)			
(b)	Explain briefly the operation of Linear induction motor and AC Series motor with neat diagram.	**(14)**	**3**	**3**
14. (a)	Describe the principle and construction of slow speed operation synchronous generator with neat diagram.	**(14)**	**4**	**3**
	(OR)			
(b)	Generalize the EMF & MMF methods of determining the regulation of an alternator with neat diagram.	**(14)**	**4**	**3**
15. (a)	**(i)** Discuss the characteristics and features of synchronous motor.	**(07)**	**5**	**3**
	(ii) Describe how the behavior of a synchronous motor differs from that of a 3 phase induction motor.	**(07)**	**5**	**3**
	(OR)			
(b)	A 5kW, three-phase Y-connected 50 Hz, 440V, cylindrical rotor synchronous motor operates at rated condition with 0.8 pf leading. The motor efficiency excluding field and stator losses is 95% and Xs = 2.5Ω. Calculate Mechanical power developed, Armature Current, Back emf, Power angle and Maximum or pull out torque of the motor.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Examine in detail the effect of varying excitation on armature current and power factor of synchronous motor.	**(10)**	**5**	**5**

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