Q. Code: 499303

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

B.E / B.TECH. DEGREE EXAMINATION, MAY 2023

Fourth Semester

EE18403 – ELECTRICAL MACHINES – II

(Electrical and Electronics Engineering)

(Regulation 2018 /Regulation2018A)

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

CO1 Determine the performance parameters of a 3 phase induction motor by suitable tests.

CO2 Evaluate different types of starters and classify the speed control schemes of 3 phase induction motors.

CO3 Characterise different types of single phase induction motors and special machines.

CO4 Predict the regulation of an alternator by different methods.

CO5 Describe the operation and characteristics of synchronous motors.

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Draw the speed-torque characteristics of an induction motor.	**1**	**2**
2.	What does crawling of an Induction motor mean?	**1**	**1**
3.	Mention the different types of speed control of a slip ring induction motor.	**2**	**2**
4.	What are the methods of braking in an Induction motor?	**2**	**1**
5.	Why single phase induction motor is not self-starting?	**3**	**2**
6.	What kind of motors are used in ceiling fan and wet grinders?	**3**	**1**
7.	Why short-pitch winding is preferred over full pitch winding?	**4**	**2**
8.	Define the term voltage regulation of an alternator.	**4**	**1**
9.	What is synchronous condenser?	**5**	**1**
10.	What is hunting and damper winding?	**5**	**1**

PART- B(5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Explain the principle of operation of 3-phase induction motor and explain how the rotating magnetic field is produced by three phase currents.	**(14)**	**1**	**3**
	(OR)			
(b)	A 6-pole, 50Hz, 3-phase induction motor running on full load develops a useful torque of 160 Nm when the rotor emf makes 120 complete cycles per minute. Calculate the shaft power output. If the mechanical torque lost in friction and that for core loss is 10 Nm. Compute (a) the copper loss in the rotor windings. (b) the input to the motor, and (c) the efficiency The total stator loss is given to be 800 W.	**(14)**	**1**	**3**

12. (a)	Elucidate the working of the star delta starter of 3d induction motor and analyze the ratio of starting torque to full-load torque.	**(14)**	**2**	**3**
	(OR)			
(b)	Explain the speed control of three phase slip ring induction motor by slip power recovery scheme with neat sketches.	**(14)**	**2**	**3**
13. (a)	Explain the double revolving field theory as applied to single phase induction motor and show that single phase induction motor is not self-starting with the help of torque-slip characteristics.	**(14)**	**3**	**3**
	(OR)			
(b)	Explain the construction and working of the hysteresis motor. In what way is the hysteresis motor different from the conventional motor?	**(14)**	**3**	**3**
14. (a)	From the first principle, derive the emf equation of an alternator and explain the effect of the winding factor.	**(14)**	**4**	**3**
	(OR)			
(b)	Explain the determination of direct and quadrature axis synchronous reactance using slip test.	**(14)**	**4**	**3**
15. (a)	Why a synchronous motor does not have starting torque? List the methods of starting synchronous motor and elucidate any two methods of starting with neat diagram.	**(14)**	**5**	**4**
	(OR)			
(b)	Describe briefly the effect of varying the excitation upon the armature current and power factor of a 3-phase synchronous motor when the input power to the synchronous motor is maintained constant.	**(14)**	**5**	**4**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	A 3-phase, 6 pole, 50 Hz induction motor takes 60 A at full load speed of 940 rpm develops a torque of 150 N-m. The starting current at rated voltage is 300 A. what is starting torque? If a star/delta starter is used determine the starting torque and starting current.	**(10)**	**2**	**5**