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

Question Paper Code:U4401

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Fourth Semester

Electrical and Electronics Engineering

21UEE401- ELECTRICAL MACHINES II

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. What is the supply frequency of an alternator having 6 poles runs at 1000rpm? CO1-U

   (a) 25 HZ (b) 40HZ (c) 50HZ (d) 60HZ

2. What kind of rotor is most suitable for turbo alternators ? CO1- U

   (a) Salient pole type (b) Non-salient pole type

   (c) both type (d) none of the above

3. The crawling in the induction motor is caused by CO2-U

   (a) High Loads (b) Low Voltage supply

   (c) Harmonic developed in the motor (d) Improper design of machine

4. A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor current will be CO2-U

   (a) 50HZ (b) 25HZ (c) 10HZ (d) 2HZ

5. Which type of starter is used in Pumps and Compressors? CO3-U

   (a) DOL Starter (b) Star Delta Starter (c) Auto Transformer Starter (d) All the above

6. Which method provides wide range of speed control, of Induction Motor? CO3-U

   (a) Cascade control (b) Stator voltage control

   (c) Pole changing method (d) Rotor Resistance Control

7. Hunting in a synchronous motor takes place on CO4-U

(a) When load varies (b) When supply voltage fluctuates

(c) When power factor is unity (d) Motor is under loaded

8. With the increase in the excitation current of synchronous motor the power factor of the motor will CO4-U

(a) Improve (b) Decrease

(c) Remain constant (d) Depend on other factors

9. Capacitor in split phase induction motor is used for CO5-U

(a) improving the power factor (b) starting the motor

(c) reducing the for harmonics (d) None of the above

10. Single phase motors are commercially manufactured up to CO5-U

(a) 2HP (b) 3HP (c)5HP (d)10HP

PART – B (5 x 2= 10 Marks)

11. Why salient pole construction is not used for high speed Alternators CO1- U

12. Why the rotor slots of a 3-phase induction motor are skewed? CO1- U

13. List the advantages of Auto Transformer Starter. CO1- U

14. What is meant by Synchronous Condenser? CO1- U

15. How will you change the direction of rotation of a split phase induction motor? CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) Explain the emf and mmf methods of determining the voltage regulation of an alternator. CO1-U (16)

Or

(b) Explain the ZPF (Portier) method of determining the regulation of an alternator. CO1-U (16)

17. (a) Draw and explain Slip Torque characteristics of induction motor with the effect of changing Rotor resistance. CO1-U (16)

Or

(b) Explain the equivalent circuit of Induction motor. CO1-U (16)

18. (a) A 3-phase, 6-pole, 50Hz induction motor takes 60A at full load speed of 940 rpm develops a torque of 150 N-m. The starting current at rated voltage is 300A. What is starting torque? If a star/delta starter is used determine the starting torque and starting current. CO4 -App (16)

Or

	(b)	A 4-pole, 3-phase, 50Hz, slip ring IM has a rotor resistance of 0.25Ω per phase and rotor reactance of 2Ω per phase at standstill condition. It is running at 1455 r.p.m speed. Calculate the value of external resistance per phase required in the rotor circuit to reduce the speed by 17 %. Assume load torque constant.	CO4 -App	(16)
19.	(a)	Explain the operation of synchronous motor at constant load variable excitation.	CO1-U	(16)
		Or		
	(b)	Explain the construction and Working Principle of Synchronous Motor.	CO1-U	(16)
20.	(a)	Explain the working principle of single phase induction motor. Mention its four applications.	CO1-U	(16)
		Or		
	(b)	Explain the principle of operation of capacitor run induction motor and capacitor start capacitor run induction motor.	CO1-U	(16)