

A

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: 54302

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Fourth Semester

Electrical and Electronics Engineering

15UEE402- AC MACHINES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- In squirrel cage induction motors, the rotor slots are usually given slight skew in order to _____ CO1- U

(a) reduce windage losses (b) reduce eddy currents

(c) reduce accumulation of dirt and dust (d) reduce magnetic hum
- If any two phases for an induction motor are interchanged _____ CO1-U

(a) the motor will run in reverse direction (b) the motor will run at reduced speed

(c) the motor will not run (d) the motor will burn
- The crawling in the induction motor is caused by _____ CO2- R

(a) low voltage supply (b) high loads

(c) harmonics developed in the motor (d) improper design of the machine
- In case of 3-phase induction motors, plugging means _____ CO2- R

(a) pulling the motor directly on line without a starter

(b) locking of rotor due to harmonics

(c) starting the motor on load which is more than the rated load

- (d) interchanging two supply phases for quick stopping
5. An alternator is said to be over excited when it is operating at _____ CO3- R
- (a) unity power factor (b) lagging power factor
- (c) leading power factor (d) lagging to leading power factor
6. Salient pole type rotors as compared to cylindrical pole type are _____ CO3- R
- (a) smaller in diameter and larger in axial length
- (b) larger in diameter and smaller in axial length
- (c) larger in diameter as well as axial length
- (d) small in diameter as well as axial length
7. A synchronous motor can develop synchronous torque _____ CO4- R
- (a) when under loaded (b) while over-excited
- (c) below or above synchronous speed (d) only at synchronous speed
8. The oscillations in a synchronous motor can be damped out by _____ CO4- R
- (a) maintaining the constant excitation
- (b) running the motor on leading power factors
- (c) providing damper bars in the rotor pole faces
- (d) oscillations cannot be damped
9. For which type of the applications a reluctance motor is preferred ? CO5- R
- (a) electric shavers (b) refrigerators
- (c) signalling and timing devices (d) lifts and hoists
10. In which single-phase AC motor, the rotor has no teeth or winding ? CO5- R
- (a) Split phase motor (b) Reluctance motor (c) Universal motor (d) Hysteresis motor
- PART – B (5 x 2= 10Marks)
11. Why an induction motor is called a 'rotating transformer'? CO1- R
12. Give the advantages of autotransformer starter. CO2 -R

13. State the conditions are to be satisfied before connecting two alternators in parallel. CO3 -R
14. How the synchronous motor can be used as synchronous condenser? CO4 -R
15. Differentiate between "Capacitor start" and "Capacitor start capacitor run" single phase induction motors. CO5 -R

PART – C (5 x 16= 80Marks)

16. (a) With neat sketch, describe the construction and principle of operation of three phase induction motor. CO1-U (16)
- Or
- (b) (i) Derive an expression for the torque of an induction motor and obtain the condition for maximum torque. CO1- App (8)
- (ii) A three phase induction motor is wound for 4 poles and is supplied from 50-Hz system. Calculate
- (i) the synchronous speed CO1- E (8)
- (ii) the rotor speed, when slip is 4%
- (iii) rotor frequency when rotor runs at 600 rpm.
17. (a) Summarize about the different types of starter used in three phase induction motors from its stator side. CO2-U (16)
- Or
- (b) Elaborate in detail about speed control of three phase slip ring induction motor by slip power recovery scheme with neat sketch. CO2-Ana (16)
18. (a) (i) Derive an the emf equation of an alternator. CO3- App (8)
- (ii) Illustrate the phenomena of armature reaction in alternator for different load power factors. CO3- App (8)
- Or
- (b) A 60-KVA, 220 V, 50-Hz, 1- ϕ alternator has effective armature resistance of 0.016 ohm and an armature leakage reactance of 0.07 ohm. Compute the voltage induced in the armature when the alternator is delivering rated current at a load power factor of (a) unity (b) 0.7 lagging and (c) 0.7 leading. CO3-E (16)
19. (a) Elaborate about V-curve and inverted V curves of synchronous motor with neat sketch. CO4- App (16)

Or

- (b) (i) Draw and explain the phasor diagram of a synchronous motor operating at lagging and leading power factor CO4- Ana (8)
- (ii) Illustrate the phenomenon of hunting and the use of damper winding with the help of dynamic equations. CO4- Ana (8)
20. (a) Analyze about the operation of a single phase induction motor using double field revolving theory. CO5- App (16)
- Or
- (b) (i) Describe the operation of shaded pole induction motor with diagram CO5- Ana (8)
- (ii) Discuss the operating principle of Linear Induction Motor with neat diagram. CO5- Ana (8)