

Reg. No. :

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

**Question Paper Code: 44302**

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

Fourth Semester

Electrical and Electronics Engineering

14UEE402 - AC MACHINES

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The slip speed of an induction motor depends upon
  - Armature current
  - Supply voltage
  - Mechanical load
  - Eddy currents
- In a three phase induction motor, the max torque
  - Is proportional to rotor resistance  $r_2$
  - Does not depend on  $r_2$
  - Is proportional to  $\sqrt{r_2}$
  - Is proportional to  $(r_2)^2$
- The speed of a three phase induction motor will increase, if the
  - number of poles of the stator winding is increased
  - No of poles of the stator winding decreased
  - Frequency of the stator supply is decreased
  - Resistance of the rotor circuit is increased
- If a three phase induction is to be operated on unbalanced power supply, then it should be operated at
  - Higher loads
  - Lower loads
  - Higher speeds
  - Lower speeds

5. The power factor of an alternator depends on
- (a) Load
  - (b) Speed of rotor
  - (c) Core losses
  - (d) Armature losses
6. In a synchronous generator, delivering lagging power factor load
- (a) The excitation emf leads terminal voltage by the power angle
  - (b) The excitation emf lags terminal voltage by the power angle
  - (c) The excitation emf leads terminal voltage by the power factor angle
  - (d) None of these
7. A synchronous motor is operating with normal excitation , with the increase in load the armature current drawn from the supply main increases due to
- (a) Increase in back emf
  - (b) Fall in motor speed
  - (c) Increase in resultant voltage across the armature
  - (d) Increase in power factor
8. When a synchronous motor is started, the field winding is
- (a) short circuited
  - (b) open- circuited
  - (c) excited from dc source
  - (d) excited from three phase ac source
9. Which type of motor suitable for a computer printer drive?
- (a) Reluctance motor
  - (b) Hysteresis motor
  - (c) Shaded pole motor
  - (d) Stepper motor
10. In a single phase repulsion motor power factor is
- (a) Always leading
  - (b) High at low speed
  - (c) High at high speed
  - (d) Always unity

PART - B (5 x 2 = 10 Marks)

11. Why are the rotor slots of a 3 phase Induction motor skewed?
12. Define crawling and cogging.
13. Define hunting of alternator.
14. Give the disadvantages of synchronous motor.
15. Name the starting methods of single phase induction motor.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Derive an expression for the torque of an induction motor and obtain the maximum torque. (8)
- (ii) Derive the torque slip characteristics of three phase induction motor and explain. (8)

Or

- (b) How the losses and efficiency of three phase induction motor can be calculated. Illustrate with necessary diagram and equations. (16)
17. (a) Explain the starting of induction motors using star- delta starter with necessary diagram and also mention the precaution with star- delta starter. (16)

Or

- (b) Explain the main methods of electrical braking of induction motors. (16)
18. (a) Derive the emf equation of Synchronous Generator. (16)

Or

- (b) Explain the two reactance concept for salient pole synchronous machine with neat diagram. (16)
19. (a) Derive the torque equation of synchronous motor. (16)

Or

- (b) Explain the effect of armature current and power factor of Synchronous motors. (16)
20. (a) Explain double field revolving theory and cross field theory. (16)

Or

- (b) Explain why single phase induction motor is not self-starting using Double field revolving theory. (16)

