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

Question Paper Code : X10394

B.E/B.Tech. DEGREE EXAMINATIONS NOV/DEC 2020 AND APRIL / MAY 2021

Fourth semester

Electrical and Electronics Engineering

EE8401- ELECTRICAL MACHINES-II

(Regulations 2017)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART- A (10 x 2 = 20 Marks)

1. State the conditions for connecting two alternators in parallel.
2. Why are alternators rated in KVA and not in kW
3. Define pull-out torque in synchronous motor.
4. Point out why synchronous is not a self-starting motor.
5. Define 'slip' of an induction motor.
6. What is the effect of change in supply voltage on starting torque of induction motor?
7. Why the starters are necessary for the induction motor?
8. List out the methods of speed control of 3 phase induction motor?
9. What happens if single-phasing occurs when the motor is running? and when it's stationary?
10. State the limitations of shaded pole motors.

PART- B (5 x 13 = 65 Marks)

11. a) (i) Explain the effect of armature reaction on different power factor loads of synchronous generators (7)
(ii) Derive the EMF equation of a 3-phase synchronous machine (6)

OR

b) (i) Sketch and explain the open-circuit and short-circuit characteristics of synchronous machines. (6)
(ii) Explain synchronous impedance method for determining regulation of an alternator. (7)

12. a) A 5kW, three-phase star connected 50 Hz, 440V, cylindrical rotor synchronous motor operates at rated condition with 0.8 power factor leading. The motor efficiency excluding field and stator losses is 95% and Xs=2.5 Ω. Calculate: i) Mechanical power developed ii)Armature current iii) Back emf iv) Power angle v) Maximum or pull out torque of the motor.

OR

b) Illustrate the phenomenon of hunting and the use of damper winding with the help of dynamic equations.

13. a) (i) Discuss the phenomena of cogging and crawling in an induction motor. (7)
(ii)Explain the operation of induction machine as a generator with neat diagram. (6)

OR

b) Sketch and explain the torque slip characteristics of the 3Φ slip ring and cage induction motor. Show the stable region in the graph

14. a) (i) Determine the starting torque of an induction motor in terms of full-load torque when started by means of (a) a star-delta switch (b) an auto-transformer with 70.7% tapping. The short-circuit of the motor at normal 4%. Neglect the magnetizing current. (6)
(ii) Explain the any two types of braking of three phase induction motor (7)

OR

b) With neat sketches explain the speed control of 3Φ induction motor by slip power recovery scheme

15. a) Using double field revolving theory, compose why a single phase induction motor is not self-starting. Also obtain the equivalent circuit of single phase induction motor with necessary equations.

OR

b) Describe the construction and working principle of the following special machines:
(i) Stepper motors (7)
(ii) Shaded pole induction motor (6)

PART- C (1 x 15 = 15 Marks)

16. a) Examine in detail the effect of varying excitation on armature current and power factor of synchronous motor.

OR

b) Develop a steady state equivalent circuit for three phase induction motor. State the difference between exact and approximate equivalent circuit.