

B.E./B.TECH. Degree Examination, December 2020

Fourth Semester

EE16402 - ELECTRICAL MACHINES – II

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. At no load induction motor has possible power factor as _____
 - a) 0.8
 - b) 0.7
 - c) 0.21
 - d) 0
2. A 3-phase, 50 Hz, 4 pole induction motor is running at 1440 rpm. Find the rotor efficiency?
 - a) 96%
 - b) 94%
 - c) 92%
 - d) 85%
3. What is the special feature of single phase induction motor?
 - a) high starting torque
 - b) low starting torque
 - c) average starting torque
 - d) zero starting torque
4. How are the stator windings of all synchronous generator connected?
 - a) star-delta connection
 - b) star connection with neutral earthed
 - c) delta connected
 - d) None
5. Draw the speed torque characteristic of double cage induction motor and compare with single cage induction motor.
6. List out the braking methods of an induction motor.
7. Why the concept of two reaction theory is applied in the salient pole machines?
8. What is the role of damper winding in a synchronous motor?

PART B - (4 X16 = 64 marks)

09. (a) When choosing the application of an induction motor, what are the roles of starting torque and maximum torque? Derive the starting and maximum torque of the three-phase induction motor. Draw the torque slip characteristics and mention the starting and maximum torque. **(16)**

(OR)

- (b) The real power input to a 415V, 50Hz, 4 pole, 3 phase induction motor running at 1470 rpm (16) is 41kW. The input power factor is 0.9. The stator losses amount to 1.1kW and the mechanical losses total 1.2kW. Calculate the line current, synchronous speed, slip, rotor copper loss, mechanical power output and efficiency.
10. (a) (i) A 15 H.P., three-phase, 6 pole, 50 Hz, 400 V, delta connected induction motor runs at (10) 960 rpm on full load. If it takes 86.4A on direct starting, find the ratio of starting torque to full-load torque with a star-delta starter. Full load efficiency and power factor are 88% and 0.85 respectively.
- (ii) Briefly compare and analyze different types of the starter of an induction motor in (6) terms of the ratio of starting torque to full-load torque.
- (OR)**
- (b) What is slip power? Explain and analyze in detail the slip power recovery scheme of a slip (16) ring induction motor.
11. (a) (i) From the first principle, derive the emf equation of an alternator and compare the (10) alternator emf equation with the transformer emf equation.
- (ii) Justify the purpose of considering pitch factor & distribution factor in an alternator (6) emf equation.
- (OR)**
- (b) (i) A 3 phase, 6 pole, star-connected alternator revolves at 1000rpm. The stator has 90 (8) slots and 8 conductors per slot. The flux per pole is 0.05wb (sinusoidally distributed). Calculate the voltage generated by the machine if the winding factor is 0.96.
- (ii) Discuss and analyze the parallel operation of two alternators with identical (8) speed/load characteristics.
12. (a) (i) Compare the construction of the synchronous motor with the slip ring Induction (6) motor and give the suggestion how the slip ring induction motor can act as a synchronous motor.
- (ii) Derive the torque equation of Synchronous motor and relate with the torque of an (10) induction motor .write your comments.
- (OR)**
- (b) Obtain and analyze the V and inverted V curves of the synchronous motor (16)

