## INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular), November – 2020

Regulation: IARE–R18

Time: 2 Hours

ELECTRICAL MACHINES - II (EEE)

Max Marks: 70

[5M]

[5M]

Question Paper Code: AEEB15

## Answer any Four Questions from Part A Answer any Five Questions from Part B

## $\mathbf{PART} - \mathbf{A}$

1. Why it is impossible for the rotor of an induction motor to rotate at the same speed as that of the magnetic field? [5M]

2. Find the relation between full load torque to maximum torque and Starting torque to full load torque [5M]

- Compute the distribution factor for a 36-slot, 4-pole, single-layer 3-Phase winding.
  Show that the current locus of a synchronous motor developed constant power is a circle.
- 5. What is meant by split phase method of motor starting.
- 6. Explain how alternating current in winding produce flux with spatial displacement [5M]
- 7. Write the merits of slip ring induction motor over the squirrel cage induction motor. [5M]
- 8. Describe how rotor starts rotate in shaded pole induction motor.

## PART - B

- 9. Explain Faradays laws of electromagnetic induction. State Flemings right hand rule, Flemings left hand rule and lenzs law. [10M]
- 10. A cage induction motor when started by means of a star-delta starter takes 160 % of full load current & develops 25 % of full load torque at starting. Calculate the starting current & torque in terms of full load torque when started by means of an auto transformer with 65% tapping. [10M]
- 11. Explain about the V/f control method and pole changing method of speed control of three phase induction motor. [10M]
- 12. A delta connected 6 pole 50Hz induction motor has a rotor resistance of 0.15 ohm per phase and excerts maximum torque at 880 RPM. Calculate the percentage maximum torque that would excerted i) At standstill ii) At 940RPM
- 13. What is voltage regulation? Discuss the synchronous impedance and mmf method of calculating voltage regulation? [10M]
- 14. A 220V 50Hz 3 phase star connected alternator has an effective resistance of 0.5 ohm per phase. A field current of 30A produced the full load current of 200A on short circuit and a line-to-line emf of 1100V on open circuit Determine the power angle of the alternator when it delivers full-load at 0.8pf lagging [10M]
- 15. Draw and explain the phasor diagram of cylindrical rotor synchronous motor at different power factor [10M]
- 16. A 6600V 3 phase star connected synchronous motor draws a full load current of 80A at 0.8pf leading. The armature resistance is 2.2 ohm and reactance 22 ohm per phase. If the stray loss are 3200W, calculate emf induced, output power and efficiency of the machine. [10M]
- 17. The following data pertains to a single phase induction motor no of poles is 4 supply voltage is 110V rated output 140W slip at rated output is 5% total copper loss at full load 28W rotational loss is 28W. Calculate the efficiency and rotor copper loss caused by the backward field. Neglect stator copper loss. [10M]
- 18. Using double revolving field theory explain the torque-slip characteristic of a single phase induction motor and prove that it cannot produce any starting torque. [10M]