Indian Maritime University
(A Central University, Govt. Of India)
End Semester Examination Dec-2019/Jan-2020
B. Tech(Marine Engineering)
Semester -IV
Electrical Machines- II
(UG11T1404/2404)

Date: 07-01-2020	Max Marks:**70**
Time:3 Hrs	Pass Marks: **35**

Part – A (compulsory)

Answer the following (10x2=20 Marks)

1. How does induction motor is used onboard ships?
2. What is synchronous reactance for synchronous machine?
3. A 4 pole, 3 phase, 50Hz induction motor runs at rotor frequency of 1.5Hz. calculate speed of the motor
4. What is synchronous condenser?
5. Why induction motor cannot run at synchronous speed?
6. What is V curve in the case of synchronous motor ?
7. Show power flow of an induction motor.
8. Benefits of having armature winding on stator in the case of alternator? (any two points)
9. Which precaution is taken to avoid cogging in an induction motor?
10. What are advantages of synchronous motor? (any two points)

Part – B

Answer any 5 out of 7 questions (5 x 10= 50 marks)

11. **A)** A 3 phase induction motor at standstill has 100V induced between its slip rings terminals. The rotor winding is star connected and has resistance and standstill reactance of 0.2 and 1ohm respectively. Calculate a) the rotor current when slip is 3% and rings are short circuited, and b) the slip and rotor current when the rotor develops maximum torque. [5]

    B) Give stepwise procedure to draw circle diagram of a 3 phase induction motor? [5]

12. A) A 3 phase, star connected synchronous generator driven at 750rpm is required to generate a line to line voltage of 440V at 50Hz on open circuit. The stator is wound with *2 slots per pole per phase.* Calculate distribution factor. [5]

B)Write a short note on synchronous impedance method to determine voltage regulation. [5]

13. A) Explain torque-slip characteristics of a 3 phase induction motor and effect of variation of resistance on torque? [5]

B) Explain D.O.L. starter used for induction motor. [5]

14. A) Write short note on parallel operation of an alternator. [5]

B) Give brief note on armature winding construction of a synchronous machine. [5]

15. A) Write note on effect of variation of an excitation with constant load and variation of load with constant excitation on synchronous machines. [5]

B) Which are different methods of speed control of an induction motor? Give details of pole changing method. [5]

16. A) Why single phase induction motor is not self starting. [4]

B) The power input to the rotor of 440V, 50Hz, 6- pole, 3 phase induction motor is 80kW. The rotor emf is observed to make 100 complete alternations per minute. Calculate a) the slip, b) the rotor speed, c) mechanical power developed? [6]

17. A) Give any 4 differences between 3 phase synchronous and induction motors. [4]

B) A 50 Hz , 8 pole induction motor has full load slip of 4%. The rotor resistance/phase is 0.01ohm and standstill reactance/phase 0.1ohm. find the ratio of maximum to full load torque and speed at which maximum torque occurs. [6]

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