



Code No. : 5093/A/M

FACULTY OF ENGINEERING
B.E. 3/4 (E & EE) II Semester (Main) Examination, May/June 2012
ELECTRICAL MACHINERY – III

Time : 3 Hours]

[Max. Marks : 75

Note : Answer **all** questions from Part A, Answer **any five** Questions from Part B.

PART – A

(25 Marks)

1. What do you understand by fractional slot winding ? 2
2. Why synchronous impedance varies with excitation ? 2
3. Why mmf method of finding voltage regulation is optimistic ? 3
4. Why the armature flux and armature mmf of salient pole alternators are not in phase ? 2
5. What are the conditions of parallel operation of alternators ? 3
6. What are the methods of starting a synchronous motor ? 2
7. How synchronous motor can be used for p.f. improvement ? 3
8. What do you understand by " x_d and x_q " ? 3
9. What is the effect of short circuit ratio on synchronous generator ? 3
10. What are the problems faced in Linear Induction motors ? 2

PART – B

(50 Marks)

11. A 480 V, 4 pole, delta connected, 50 Hz cylindrical rotor alternator has 0.015Ω / phase of armature resistance and 0.1Ω / phase of synchronous reactance. The rated current and p.f. are 1200 A and 0.8 lagging respectively. At full-load, mechanical losses are 40 kW and con losses are 30 kW. The resistance of field winding is 500Ω . The OCC of the alternator is as follows.

I_f	1	2	3	4	5	6	7
OC Voltage	120	250	360	451	505	532	550



- a) What is the field current of no-load if terminal voltage is 480 V ?
- b) What is the field current if the alternator is delimiting rated load at rated p.f. and rated voltage ? What is power output, proved angle and efficiency.
- c) What is the field current for load current of 1200 A at 480 V on 0.8 p.f. loading. 10
12. a) Explain static excitation system for are alternator. 4
- b) Explain mmf method of finding voltage regulation of alternator. 6
13. a) Derive the power angle characteristic of salient pole alternator from fundamentals. 5
- b) Explain how x_d and x_q are determined experimentally. 5
14. A 10 MVA, 3 phase, star connected, 11 kV, 16 pole, 50 Hz, salient pole synchronous motor has $x_d = 6 \Omega$ and $x_q = 4 \Omega$ per phase. The motor is working at full load unity p.f. and rated voltage. Find :
- a) current
- b) power angle
- c) synchronizing power and torque per electrical degree. 10
15. a) Explain V-curves and inverted v-curves for synchronous motor. 5
- b) Explain the operation of synchronous-induction motor. 5
16. Explain in detail double revolving field theory of single phase motors with their equivalent Ckts and characteristics. 10
17. With short notes on : 10
- a) Repulsion motor
- b) Split phase motor.