

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 50342

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Electrical and Electronics Engineering

15UEE402 - AC MACHINES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In a three phase induction motor, the relative speed of stator flux with respect to _____ is zero.
(a) stator winding (b) rotor (c) rotor flux (d) space
2. In a three phase motor, the rotor field rotates at synchronous speed with respect to
(a) stator (b) rotor (c) stator flux (d) none of these
3. For the purpose of starting an induction motor, a Y- Δ switch is equivalent to an auto-starter of ratio _____ percent.
(a) 33.3 (b) 57.7 (c) 73.2 (d) 60
4. An induction motor has a short-circuit of 7 times the full-load current and a full load slip of 4 percent. Its line-starting torque is _____ of times the full-load torque.
(a) 7 (b) 1.96 (c) 4 (d) 49
5. Zero power factor method of an alternator is used to find its
(a) efficiency (b) voltage regulation
(c) armature resistance (d) synchronous impedance

6. The power factor of an alternator is determined by its
 - (a) speed
 - (b) load
 - (c) excitation
 - (d) prime mover
7. If the field of a synchronous motor is under excited, the power factor will be
 - (a) lagging
 - (b) lagging
 - (c) unity
 - (d) more than unity
8. In a synchronous motor, damper winding is provided in order to
 - (a) stabilize rotor motion
 - (b) suppress rotor oscillation
 - (c) develop necessary starting torque
 - (d) both (b) and (c)
9. The starting winding of a single-phase motor is placed in the
 - (a) rotor
 - (b) stator
 - (c) armature
 - (d) field
10. The direction of rotation of a single-phase motor can be reversed by
 - (a) reversing connections of both windings
 - (b) reversing connection of starting winding
 - (c) using a reversing switch
 - (d) reversing supply connections

PART - B (5 x 2 = 10 Marks)

11. Draw the torque-slip characteristics curve of three phase induction motor.
12. What is crawling in induction motor?
13. Write the EMF equation of synchronous generator.
14. What is hunting in synchronous motor?
15. Draw the circuit diagram of shaded pole single phase induction motor.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) With neat diagram explain the construction and operation of three phase induction motor. (8)
- (ii) Obtain expression for torque equation of three phase induction motor. (8)

Or

- (b) (i) Discuss how to obtain equivalent circuit of three phase induction motor. (8)

- (ii) A three phase, 400V induction motor gave the following test readings;
No-load : 400V, 1250W, 9A
Short-circuit: 150V, 4 kW, 38A
If the normal rating is 14.9 kW, find from the circle diagram, the full-load value of current, p.f. and silp. (8)

17. (a) (i) With diagram explain working of star-delta starter. (8)
(ii) Discuss pole changing method of speed control of three phase induction motor. (8)

Or

- (b) (i) Discuss electrical braking of induction motor. (8)
(ii) Explain how to control speed by injection of emf in the rotor circuit of three phase induction motor. (8)
18. (a) (i) A three phase, star connected alternator is rated at 1600 kVA, 13,500 V. the armature resistance and synchronous reactance are 1.5Ω and 30Ω respectively per phase. Calculate the percentage regulation for a load of 1280 kW at 0.8 leading power factor. (8)
(ii) Discuss how to obtain X_d from slip test of an alternator. (8)

Or

- (b) (i) Describe how to obtain voltage regulation by ZPF method. (8)
(ii) Discuss briefly the two reaction theory for salient pole machine. (8)
19. (a) (i) Obtain torque equation of synchronous motor. (8)
(ii) Discuss how to obtain 'v' and ' λ ' of synchronous motor. (8)

Or

- (b) (i) Explain various methods of starting of synchronous motor. (8)
(ii) Discuss current loci for constant power input of synchronous motor. (8)
20. (a) (i) Explain double field revolving field theory. (8)
(ii) Explain principle of working of split phase single phase induction motor. (8)

Or

- (b) (i) Obtain equivalent circuit of single phase induction motor. (8)
- (ii) Discuss about the working of reluctance motor. (8)
-