NKOCET, Solapur
SE Electrical
Electrical Machines – II
Question Bank

1. Enlist the different methods of excitation system of alternators.

2. Write a note on Power Angle Characteristics.

3. Explain armature reaction in synchronous generator with suitable diagrams and waveforms.

4. Explain the working principle of synchronous motor.

5. Describe synchronous condenser in detail.

6. Write a short note on damper winding with reference to synchronous machine.

7. What do you mean by Synchronising of alternator? Explain the Synchronisation procedure of single phase alternators.

8. Write a note on Hunting and damping phenomena in Synchronous machine.

9. Derive the equation for the power developed by a synchronous generator.

10. Draw and explain vector diagram of loaded alternator for unity p.f, lagging p.f. & leading p.f.

11. Describe the classification of A.C. Machines.

12. Explain in detail working principle and constructional features of synchronous machine.

13. Explain in detail working principle and constructional features of induction machines.

14. Derive the emf equation of an alternator.

15. Explain in detail different types of armature windings in synchronous generators.

16. Derive an expression for Pitch factor & Distribution factor.

17. Explain in detail harmonics in generated emf, causes of harmonics and their suppressions.

18. A 3-phase, 50HZ, 8-pole alternator has a star-connected winding with 120 slots and 8 conductors per slots. The flux per pole is 0.05 wb, sinusoidally distributed. Determine the line voltage & phase voltage.

19. Calculate the pitch factor for the under-given windings: (a) 36 stator slots, 4- poles, coil-span, 1 to 8 (b) 72 stator slots, 6 poles, coils span 1 to 10 and (c) 96 stator slots, 6 poles, coil span 1 to 12. Sketch the three coil spans.

20. Find the no load line voltage of a star connected 4-pole alternator from the following:
    Flux per pole= 0.12 Weber, Slots per pole per phase = 4
    Conductors/ slot=4, Two layer winding, with coil span = 150°

21. Find the value of kd for an alternator with 9 slots per pole for the following cases:
    - One winding in all the slots
    - one winding using only the first 2/3 of the slot/pole.
    - three equal winding placed sequentially in 60^0 group

22. A 3-phase, 16-pole alternator has a star-connected winding with 144 slots and 10 conductors per slot. The flux per

pole is 0.03Wb, Sinusoidally distributed and the speed is 375 r.p.m. Find the frequency rpm and the phase and line e.m.f. Assume full-pitched coil.

23. Find the no-load phase and line voltage of a star-connected 3-phase, 6-pole alternator which runs at 1200 rpm, having flux per pole of 0.1 Wb sinusoidally distributed. Its stator has 54 slots having double layer winding. Each coil has 8 turns and the coil is chorded by 1 slot.

24. Derive an expression for starting torque & running torque of 3Ø induction motor.

25. Derive the equation for maximum torque condition at starting & running torque.

26. Give Constructional details of 3Ø induction motor with neat sketches.

27. Why does the rotor of an induction motor rotate explain briefly?

28. Draw and explain torque-slip characteristics of 3Ø induction motor assuming torque equation at slip 's'

29. Explain concept of two phase rotating magnetic field and three phase rotating magnetic field.

30. A 50 Hz, 8pole IM has the full load slip of 4% the rotor resistance = 0.1Ω find the ratio of max to full load torque & the speed at which the max torque occurs.

31. Find Tm/Tf of 4 pole 50Hz, 3Ø IM Z2= (0.3+j1.2) Ω at stand still & full slip is 4%

32. Explain with neat diagram: DOL Starter & Auto-transformer starter.

33. Explain Rotor Resistance starter & Star-Delta Starter with neat circuit diagram.

34. Explain construction & working of double cage 3ph IM and draw equivalent circuit of double cage IM.

35. Explain construction & working of deep bar cage 3ph IM.

36. Explain Crawling and Cogging effect in detail.

37. Explain induction motor as an induction generator and its limitations.

38. Explain procedure to construct a circle diagram for induction motor.

39. Explain double revolving field theory & cross field theory. Draw equivalent circuit diagram for the same.

40. Why single phase I.M. is not self-starting?

41. Explain with neat circuit diagram & vector diagram Split phase I.M

42. Explain neat circuit diagram & vector diagram Capacitor start I.M.

43. Explain neat circuit diagram & vector diagram Capacitor Start-Run I.M.

44. Explain neat circuit diagram & vector diagram Shaded Pole Induction Motor. State its applications. Is it possible to change the direction of rotation of a shaded pole type IM? Explain your statement.

45. Show that backward slip Sb =(2-s) where s is the forward slip. Draw equivalent circuit of rotor.

46. Write applications of all single phase I. M.

47. Explain working and construction of Single phase synchronous motors, permanent magnet AC motors & AC servo motors

48. A 3Ø- slip ring IM gives a reading of 60v across slip rings when at rest with normal stator voltage applied the rotor is star connected & has an impedance of (0.8+j6) Ω per phase find the rotor current when machine is
    - At standstill with slip-ring joined to a star connected stator with a phase impedance of (4+j3) Ω
    - Running normally with 5% slip

49. A 50Hz, 6 pole , IM runs at 94.5% of Synchronous speed developing torque of 120 N.M. the mechanical torque lost is 4 N.M. & stator loss is 1430 watts. Calculate efficiency.

50. Explain cascaded connection speed method of controlling in detail.