Question Bank (I-Scheme)

Name of course: Industrial AC Machines **Unit Test: II**

Subject code: 22523 (IAM) **Semester: V** **Program: EE**

Chapter 3: (Three Phase Alternators)

2 Marks

1. Define chording factor and distribution factor.
2. Compare cylindrical rotor with salient pole rotor on any two points.
3. Draw vector diagram of loaded alternator at lagging pf.
4. Calculate the distribution factor for 36 slots, 4 pole, single layer three phase winding.
5. Define voltage regulation of alternator.

4 Marks

6. State any four advantages of having stationary armature in case of three phase alternator.
7. In case of alternator, explain armature reaction and its effects on i) unity power factor, ii) zero pf lagging and iii) zero pf leading.
8. A 400V,10 KVA , 3 phase star connected alternator has resistance per phase of 1.0 ohm. Open circuit voltage per phase of 90V is obtained for field current of 1.0 A. For the same field current, short circuit current per phase is 15A. Calculate: i) Synchronous impedance, ii) synchronous reactance, iii)open circuit voltage per phase and iv) Regulation while supplying a load current of 15Aat 0.8 power factor lag.
9. A 3 phase, 50Hz, 8 pole alternator has star connected winding with 120 slots and 8 conductors per slot. The flux per pole is 0.05 Wb, sinusoidally distributed. Determine the phase and line voltages .assume full pitch coil.
10. Derive the EMF equation of Alternator. State the meaning of each term used therein.
11. Define and explain distribution factor of a winding with neat sketch.
12. A 3-phase, star connected alternator rated at 1600 kVA ,13500 V; The armature resistance and synchronous reactance are 1.5 Ω and 30 Ω respectively per phase- calculate percentage voltage regulation for a load of 1280 kW at a power factor: (i) 0.8 leading (ii) unity iii) 0.8 lag
13. A 3Ø, star connected synchronous generator driven at 750 rpm is required to generate a line voltage at 440 V, t 50 Hz on open circuit. The stator is wound with 2 slots per pole per phase and each coil has 4 turns. Calculate the useful flux per pole.(assume full pitch coil)

Chapter 4: (Synchronous Motors)

2 Marks

1. Define synchronous reactance &synchronous impedance.
2. State methods of starting of synchronous motor.
3. Define synchronous reactance. State its formula.
4. State working principle of operation of synchronous motor.
5. List various losses occurring in synchronous motor.
6. List different torques in synchronous motor.

4 Marks

1. Describe any two method of starting synchronous motors.
2. Explain hunting and phase swinging in synchronous motor. State its causes and effects.
3. Draw &explain torque slip characteristics of permanent magnet synchronous motor.
4. Draw and explain V and inverted V curves of synchronous motor.
5. A 20 pole,693V, 50 Hz,3 phase, delta connected synchronous motor is operating at no load with normal excitation. It has armature resistance per phase of zero and synchronous reactance of 10 ohm. If the rotor is restarted by 0.5 degree(mechanical) from its synchronous position , compute i) rotor displacement in electrical degrees ii) armature emf/phase iii) armature current /phase, iv) power drawn by the motor and v) power developed by armature.

Chapter 5: (Fractional Horse Power Motors)

2 Marks

1. List any four applications of BLDC motor.
2. Draw schematic diagram of AC servo motor.
3. Give one application each for AC and DC servo motor.

4 Marks

1. Draw and explain torque speed characteristics of stepper motor.
2. Draw &explain torque slip characteristics of permanent magnet synchronous motor.
3. Describe the working of synchronous reluctance motor with the help of neat diagram.
4. Draw and explain construction of Permanent magnet stepper motor.
5. Draw and explain AC servo motor.