BE Semester-VITH (ELECTRICAL) Question Bank

(ELECTRICAL MACHINE III)

All questions carry equal marks(10 marks)

Q.1	Explain Construction, principle of operation of auto synchronous motor.
Q.2	Explain B-H loop and demagnetization characteristics, Residual flux density, and Coercivity for permanent magnet materials.
Q.3	Explain why is a rotating field system used in preference to a stationary field in alternators?
Q.4	Describe the difference in construction of rotors of alternators used in hydroelectric plants and steam plants?
Q.5	A 3 phase, 50 Hz , 8 pole alternator has a star connected winding with 120 slots and 8 conductors per slot. The flux per pole is 0.05 wb, sinusoidal distributed. Determine the phase and line voltages.
Q.6	Explain potier triangle method of determine the voltage regulation of an alternator?
Q.7	Two identical, three phase alternator operating in parallel share equally a load of 1000 KW at 6600 V and 0.8 lagging power factor. The field excitation of the first machine is adjusted so that the armature current is 50A. at lagging power factor. Determine (a) the armature current of the second alternator, and (b) the power factor at which each machine operates.
Q.8	Explain two reaction theory of salient pole synchronous machine.
Q.9	What is necessity of parallel operation of alternators? State the conditions necessary for paralleling alternators.
Q.10	Why is synchronous motor not self starting? What methods are generally used to start the synchronous motors?
Q.11	What are the V curves of synchronous motor? What are the main characteristics of a synchronous motor?
Q.12	State the applications of synchronous motors. Compare synchronous motor with induction motor drives.
Q.13	What is synchronous condenser? Explain with help of phasor diagram its operation. What re its application?
Q.14	Explain working principle, construction and applications of PMBLDC motors.

Q.15	Write a short note on Switched Reluctance Motors(SRM)
Q.16	Write short note on AC servo motor.
Q.17	Describe construction, working and applications of Hysteresis motor
Q.18	List different methods for finding voltage regulation of an alternator and Explain any one method.
Q.19	A 3.5 MVA, 3-phase synchronous generator rated at 6.6 KV has 32 poles. Its direct and quadrature axis synchronous reactance as measured by the slip test are 9.6 Ω and 6 Ω respectively. Neglecting armature resistance, determine the regulation and excitation emf needed to maintain 6.6 KV at the terminals when supplying a load of 2.5 MW at 0.8 p.f. lagging. What maximum power can generator supply at the rated terminal voltage, if the field becomes open circuited
Q.20	Derive the expression for the input and output power developed by Synchronous motor. Also derive the maximum input and output power developed by synchronous motor.
Q.21	What is armature reaction? Explain the effect of armature reaction on the terminal voltage of an alternator
Q.22	A 4 KVA, 3 phase, 110V, 50Hz, star connected alternator has Xd = 3 ohm and Xq = 2 ohm. The machine is delivering full load current of 0.8 p.f lagging at rated voltage. Find the induced emf, load angle and maximum power output of the alternator
Q.23	Explain Axial flux PM machines and Doubly salient PM machines.
Q.24	What are the causes of harmonics in the voltage waveform of an alternator? How can these be minimized?
Q.25	State the conditions necessary for paralleling alternators. Explain one dark and two bright lamp methods with necessary electrical circuit diagram.
Q.26	A 3 phase star connected 1000KVA, 11000V alternator has rated current of 52.5 A. The ac resistance of the winding per phase is 0.45 ohm. The test results are given below: O.C. Test: field current = 12.5 A, voltage between lines = 422 V S.C. Test : field current = 12.5A, line current = 52.5A Determine the full load voltage regulation of the alternator for (i) 0.8 p.f lagging and (ii) 0.8 p.f leading loads with synchronous impedance method
Q.27	Why synchronous motor is not self starting? Explain the methods of starting of synchronous motor.
Q.28	Explain the effect of varying excitation at constant load on synchronous Motor.
Q.29	Derive emf equation of alternator. Explain distribution factor with effect of Harmonics.
Q.30	Explain construction , working principle and applications of Induction Generator

Q.31	Explain the two reaction theory of salient pole machine in detail with phasor diagram
Q.32	A 3.5 MVA, 3-phase synchronous generator rated at 6.6 KV has 32 poles. Its direct and quadrature axis synchronous reactance as measured by the slip test are 9.6 Ω and 6 Ω respectively. Neglecting armature resistance, determine the regulation and excitation emf needed to maintain 6.6 KV at the terminals when supplying a load of 2.5 MW at 0.8 p.f. lagging. What maximum power can generator supply at the rated terminal voltage, if the field becomes open circuited?
Q.33	Explain the effect of varying the excitation and torque of the prime-mover of Synchronous machine connected to infinite bus-bar.
Q.34	Explain the working of synchronous phase modifier.
Q.35	Explain single phase induction regulator.
Q.36	Calculate the r.m.s. value of the induced emf per phase of a 10-pole, 3-phase, 50 Hz, star connected alternator with 2 slots per pole per phase and 4 conductors per slot in two layers. The coil span is 150 degree. The flux per pole has a fundamental component of 0.12 Wb and 20% third harmonic component
Q.37	Draw the combined Space and Time Phasor Diagram of Cylindrical rotor alternators for the following conditions (i) lagging p.f. (ii) leading p.f. and (iii) unity p.f.
Q.38	Briefly explain the ZPF method of finding the voltage regulation of Alternator.
Q.39	A star connected, 11 KV alternator, with synchronous impedance of 1+j10 per phase is connected to infinite bus at rated voltage. The alternator delivers an armature current of 100 A at unity power factor to the bus bar. With the alternator output remaining constant, the alternator excitation is increased by 15%. Find the new values of armature current, load angle and p.f.
Q.40	Explain coil span factor and distribution factor of an alternator.