

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
Department of Electrical & Electronics Engineering
III/IV B. Tech., Semester-II
PERFORMANCE AND DESIGN OF ELECTRICAL MACHINES -III

ASSIGNMENT-I

1	a	What is the effect of chording and distribution of armature winding on the emf generated in an alternator?	CO1
	b	Explain why synchronous impedance method of computing the voltage regulation of a synchronous machine leads to a pessimistic value at lagging power factor loads.	CO1
2		A 3-phase, 8 pole alternator has a star connected winding with 72 slots and 6 conductors per slot. The flux per pole is 30mWb and the speed is 750 rpm. Find the frequency and the line emf under open circuit conditions.	CO1
3		Find the synchronous impedance and reactance of a 3-phase star connected alternator in which a field current of 5 amps produces an armature current of 250 amps on short circuit and a generated emf of 1500 V on open circuit. The armature resistance per phase is 1ohm.	CO1
4		Explain the MMF method to predict the voltage regulation of a 3-phase alternator.	CO1
5		A 15 MVA 6.6 KV, 3-phase, star connected alternator with armature resistance of 0.4 ohm per phase and synchronous reactance of 6 ohms per phase delivers a full load current at 0.8 pf lagging with rated voltage..Estimate the terminal voltage for the same excitation and load current at 0.8 pf leading.	CO1
6		A 1500 KVA, 6000 V, 3-Phase star connected alternator with synchronous impedance per phase of $(0.4+j6)$ ohms delivers full load current of pf 0.8 lagging and normal voltage. Estimate the terminal voltage for the same excitation and load current at 0.8 pf leading.	CO1
7		Two similar alternators running in parallel have an emf induced of 1200 V per phase. The synchronous impedance per phase of two alternators is $(0.1 + j2.5)$ ohms and $(0.3 +j4)$ ohms per phase. The two alternators supply a load impedance of $(6+j8)$ ohms per phase. Find the terminal voltage of the machine.	CO2
8		With a circuit diagram, explain the test to be conducted for determining X_d and X_q of a Salient pole alternator. Explain the reason why the slip be kept as small as possible during the test.	CO2
9		A 2000 volts, 3-phase, star connected synchronous motor has synchronous reactance of 5 ohms per phase. For an excitation voltage of 3000 volts, the motor takes an input of 900 kW at rated voltage. Find the line current and power factor.	CO2
10		Explain V and inverted V curves of synchronous machine.	CO3