Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem - IV Examination June- 2011

Subject code: 140902

Subject Name: Electrical power

Date:08/06/2011 **Time: 10.30 am – 01.00 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Draw the schematic diagram of a steam power station.	**06**
	(b)	Explain the essential factors which influence the choice of site for a hydro power station.	**04**
	(c)	Write short note on "Nuclear Plant Impacts".	**04**
Q.2	**(a)**	Explain the working of a gas turbine power plant with a schematic diagram.	**07**
	(b)	Explain with a neat sketch the various parts of nuclear reactor.	**07**
		OR	
	(b)	Describe with the help of a neat sketch, the working of solar power plant.	**07**
Q.3	**(a)**	Derive equation for inductance of single phase two wire line.	**07**
	(b)	A two conductor single phase transmission line operates at 50 Hz. The diameter of each conductor is 20 mm and spacing between conductors is 3 m. calculate (i) loop inductance of line per km (ii) inductance of each conductor per km (iii) inductive reactance per km.	**07**
		OR	
Q.3	**(a)**	Derive equation for capacitance of three phase line with unsymmetrical spacing.	**07**
	(b)	Single phase, 32 km long line consists of two parallel wires each of 0.5 cm in diameter and 1.5 m apart. If the line voltage is 50 kV at 50 Hz, calculate the total charging current of the line when it is open circuited.	**07**
Q.4	**(a)**	Explain different types of distribution system with diagram.	**07**
	(b)	Discuss the various conductor materials used for overhead lines. What are their relative advantages and disadvantages.	**07**
		OR	
Q.4	**(a)**	Explain function of the major equipments installed in the substation.	**07**
	(b)	Give reason for unequal potential distribution over string of suspension insulators. Define string efficiency. Can its value be equal to 100%?	**07**
Q.5	**(a)**	Discuss the disadvantages of a low power factor.	**04**
	(b)	Explain the various methods of power factor improvement.	**06**
	(c)	A factory which has a maximum demand of 175 MW at a power factor of 0.75 lagging is charged at Rs. 72 per kVA per annum. If the phase advancing equipment costs Rs 120 per kVAR, find the most economical power factor at which factory should operate. Interest and depreciation total 10% of the capital investment on the phase advancing equipment.	**04**
		OR	
Q.5	**(a)**	Explain following methods of earthing with diagram. (i) arc suppression coil earthing (ii) voltage transformer earthing	**07**
	(b)	Explain skin effect and proximity effect.	**07**

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