Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-III Remedial Examination March 2010

Subject code: 132401

Subject Name: Basic Power System Engineering

Date: 11 /03 /2010 **Time: 11.00 am – 01.30 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)**	Define "Power Factor". Explain the Power Triangle and deduce necessary formula from it. Enlist the causes of Low Power Factor.	**08**
	(b)	Enumerate the disadvantages of Low Power Factor. Give the various name of power factor improvement equipment.	**06**
Q.2	**(a)**	Discuss various methods of power factor improvement.	**07**
	(b)	A 3-Phase, 5kw Induction Motor has a p.f. of 0.75 lagging . A bank of capacitor (is connected in delta across the supply terminals and p.f. raised to 0.9 lagging Determine the KVAR rating of the capacitors connected in each phase.	**07**
		OR	
	(b)	A single phase motor connected to a 240V, 50Hz, supply takes 20 Amp. at a power factor of 0.75 lagging. A capacitor is shunted across the motor terminals to improve the p.f. to 0.9. Determine the capacitance of the capacitor to be used.	**07**
Q.3	**(a)**	Prove that total inductance of two parallel copper conductors forming a return Circuit is L= (4.606 X $Log10^{d/r}$ + 0.4) X 10^{-7} H/m per conductor .	**07**
	(b)	A three phase three wire system has its conductors arranged at the corners of an equilateral triangle of 2-m side. The diameter of each conductor is 2.5 cm. Calculate the inductance and capacitance of each conductor.	**07**
		OR	
Q.3	**(a)**	Write a detailed note on bundled conductors	**06**
	(b)	Brief the following component used in transmission and distribution system. (i) Transformer (ii) Breaker (iii) Isolator (iv) Fuses.	**08**
Q.4		State the factors to be considered for the selection of thermal power plant. Draw Schematic diagram of the thermal power plant and explain the following. (i) Feed water and steam cycle. (ii) Cooling water cycle	**14**
		OR	
Q.4		Draw the schematic diagram of Hydro power plant and explain the following terms. (i) Catchments area. (ii) Tunnels. (iii) Spillways.	**14**
Q.5	**(a)**	Write the principle of HVDC transmission. Explain its operation and control techniques with the help of block diagram.	**08**
	(b)	Write a comprehensive note on Earthing transformer	**06**
		OR	
Q.5	**(a)**	Enlist the basic equipments used in HVDC transmission. Explain the operation of Converters in HVDC transmission system.	**08**
	(b)	What do you mean by "Neutral Grounding"? Explain Earthing with respect to Power system.	**06**

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