GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. Sem-III   Remedial Examination May 2011

Subject code: 132401   Subject Name: Basic Power Systems Engineering

Date: 28-05-2011   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)** Why is there phase difference between voltage and current in a.c. circuit? Explain the concept of power factor. Also discuss the disadvantages of low power factor.   **07**

(b) Explain the causes of low power factor of the supply system and discuss power factor improvement.   **07**

Q.2 **(a)** Discuss various power factor improvement equipments used in power system.   **07**

(b) Pick up the correct words / figures from the brackets and fill in the blanks.   **07**

    I)   The power factor of an a.c. circuit is given by _____ power divided by _____ power.
         (active, reactive , apparent)

    II)   The lagging power factor is due to _____power drawn by the circuit.
         (active, reactive)

    III)   The major reason for low lagging power factor of supply system is due to the use of _____ motors.
         (induction , synchronous)

    IV)   An over-excited synchronous motor on no load is known as _____ .
         (condenser, synchronous condenser)

    V)   KVAR = _____ tan Φ.
         (KW, KVA)

    VI)   The smaller the lagging reactive power drawn by circuit, the _____ is its power factor.
         (smaller, greater)

    VII)   The maximum value of power factor can be__.
         (1.1, 1, 0.9)

OR

(b) A single phase motor connected to a 240 V, 50Hz supply takes 20 A at a power factor of 0.75 lagging. A capacitor is shunted across the motor terminals to improve the power factor to 0.9. Determine the capacitance of the capacitor to be used.   **07**

1

Q.3	**(a)**	Draw and explain the schematic diagram of hydro power plant.	**07**
	(b)	Explain the following terms with respect to hydro power plant. I) Spill ways II) Catchments area III) Tunnels	**07**

<div align="center">OR</div>

Q.3	**(a)**	State the factors to be considered for the selection of thermal power plant. Draw the schematic diagram of thermal power plant.	**07**
	(b)	Explain the following terms with respect to thermal power plant. I) feed water and steam cycle. II) Cooling water cycle.	**07**

Q.4	**(a)**	What is neutral grounding? What are the advantages of neutral grounding?	**07**
	(b)	What is solid grounding? Enlist its advantages and disadvantages.	**07**

<div align="center">OR</div>

Q.4	**(a)**	What is resistance grounding? What are its advantages and disadvantages?	**07**
	(b)	Write the principle of HVDC transmission. Explain its operation & control technique with block diagram.	**07**

Q.5	**(a)**	Derive equation for inductance of single phase two wire line.	**07**
	(b)	Explain transposition of transmission line.	**07**

<div align="center">OR</div>

Q.5	**(a)**	Derive equation for capacitance for the three phase line with symmetrical spacing.	**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 capacitance of each conductor.	**07**

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