# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2150908   **Date:09/05/2016**

Subject Name:Electrical Power System – I

Time:02:30 PM to 05:00 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)**	Compare the merits and demerits of underground versus overhead system.	**07**
	(b)	Name the different types of insulators used in transmission system. Explain suspension type insulator.	**07**
Q.2	**(a)**	Define and explain string efficiency. What are the various methods of improving it?	**07**
	(b)	An overhead transmission line conductor is subjected to a horizontal wind load of 1.78kg/m and vertical ice loading of 1.08 kg/m. If the maximum permissible sag is 6 metres, calculate the permissible span between two supports allowing a factor of safety of 2. Weight of conductor is 0.844 kg/m.	**07**
		OR	
	(b)	Define per unit value. What are the advantages of per unit system? Write the equation for per unit impedance if a change of base occurs.	**07**
Q.3	**(a)**	Derive an expression for the inductance per phase of a three phase symmetrically spaced overhead transmission line.	**07**
	(b)	In a single phase line as shown in figure, conductors a and a' in parallel form one conductor while conductors b and b' in parallel form the return path. Calculate the total inductance of the line per km assuming that current is equally shared by the two parallel conductors. Conductor diameter is 2.0 cm.	**07**
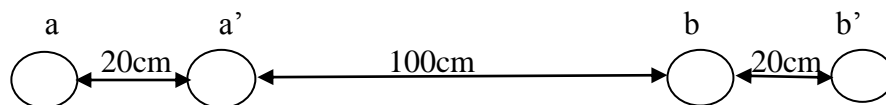
OR

Q.3	**(a)**	Derive an expression for the capacitance of a single phase overhead transmission line.	**07**
	(b)	A 3 phase, 50 Hz, 132 kV overhead line has conductors placed in a horizontal plane 4 m apart. Conductor diameter is 2 cm. if the line length is 100 km, calculate the charging current per phase assuming complete transposition.	**07**
Q.4	**(a)**	Explain with neat sketch the construction of cable.	**07**
	(b)	What is meant by grading of cable? Explain why and how the grading of cable is done?	**07**
		OR	
Q.4	**(a)**	What are the advantages of DC transmission over AC transmission?	**07**
	(b)	State and explain Kelvin's law for obtaining the size of conductor for transmission. Discuss its limitations.	**07**
Q.5	**(a)**	Discuss with neat sketches, different connection schemes of distribution systems.	**07**

(b) A DC two line distributor AB 600 metre long is fed at 440 V from substation A and at 430 V from substation B, the loads are:

07

100 A at C,150 m from A
200 A at D,150 m from C
250A at E , 50 m from D
300 A at F,100 m from E

      If each line conductor has a resistance of 0.01 ohm per 100 metres, calculate the current supplied from sub stations A and B and the voltage across each load.

OR

Q.5 **(a)** Explain with neat diagram, 3- phase 4-wire system of distribution of electrical power.

07

(b) A dc distributor cable is 1000 metre long and is loaded as undar:

07

Distance from feeding point "A"(metres)	250	750	1000
Load in Amperes	100	200	300

      The resistance of each conductor is 0.025ohm per 1000 metre. Find the voltage at each load point if the voltage at the feeding point A is maintained at 250 V.

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