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GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2018

Subject Code:2150908   **Date:20/11/2018**

Subject Name:Electrical Power System – I

Time: 10:30 AM TO 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.**

			MARKS
Q.1	**(a)**	What are the disadvantages of DC transmission System?	**03**
	(b)	Differentiate between feeder, distributor and service mains	**04**
	(c)	Compare the merits and demerits of underground versus overhead system	**07**
Q.2	**(a)**	What is Skin effect and proximity effect?	**03**
	(b)	What are the factors that affect the sag in the transmission line?	**04**
	(c)	Define the sag in overhead line. Derive the equation of sag in case of When supports are at equal and unequal level. Also find the sag during effect of wind and ice loading	**07**

OR

	(c)	What is string efficiency? Derive its equation in case of 3 disc string. Explain methods of improving string efficiency.	**07**
Q.3	**(a)**	Give comparison conductor material in overhead system.	**03**
	(b)	Define and explain primary and secondary distribution system with single line diagram	**04**
	(c)	With equation find out the volume of conductor in case of 3-phase 3-wire system and 3-phase 4-wire system in overhead power transmission	**07**

OR

Q.3	**(a)**	Explain self GMD and mutual GMD.	**03**
	(b)	Give classification of distribution systems	**04**
	(c)	Name the different types of insulators used in transmission system. Explain Any one in brief with diagrams.	**07**
Q.4	**(a)**	What are the advantages of per unit system?	**03**
	(b)	What are the properties of insulating material for cables? name some insulating materials used in cables	**04**
	(c)	Two generators G1 and G2 are connected in parallel to a bus bar. Generator G1:10MVA,13.2KV,reactance=15% Generator G2:15MVA,13.2KV,reactance=15% The generators G1 and G2 feed supply to two motors M1 and M2 respectively. Motor M1:8MVA,12.5KV,reactance=20% Motor M2:12MVA,12.5KV,reactance=20% Assuming base quantities as 50MVA and 13.8KV.Draw reactance diagram.	**07**

OR

Q.4	**(a)**	What is the effect of earth on Transmission line capacitance?	**03**
	(b)	What do you mean by transposition of line? What is it's effect on the performance of the line.	**04**

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(c)   A 2-wire d.c.distributor AB is 300m long. It is fed at point A .The various **07** loads and their positions are given below:

At point	Distance from A in amperes in meters	Concentrated load in amperes
C	40	30
D	100	40
E	150	100
F	250	50

If the maximum permissible voltage drop is not to exceed 10V, Find the cross sectional area of the distributor. Take $\rho = 1.78 \times 10^{-8}$ Ωm.

Q.5   **(a)**   Explain with neat sketch the construction of cables.   **03**

       (b)   A single –core cable has a conductor diameter of 1c.m. and insulation **04** thickness of 0.4cm. If the specific resistance of insulation is 5×10^{14} Ω-cm, calculate the insulation resistance for a 2km length of cable.

       (c)   In a 33KV over headline, there are three units in the string of insulators. If **07** the capacitance between each insulator pin and earth is 11% of self capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency.

OR

Q.5   **(a)**   Write shot note on bundle conductors.   **03**

       (b)   What are the methods of improving string efficiency? Explain any one in **04** brief.

       (c)   Explain the steady state model of synchronous machine with diagram.   **07**

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