

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020****Subject Code:2150908****Date:20/01/2021****Subject Name:Electrical Power System – I****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
<b>Q.1</b>	(a) Discuss the advantage of high transmission voltage	<b>03</b>
	(b) State and prove the Kelvin's law for size of conductor for transmission.	<b>04</b>
	(c) A 50 Km long transmission line supplies load of 5 MVA at 0.8 p.f lag at 33 KV. The efficiency of the transmission line is 90 %. Calculate the volume of conductor Aluminum required for the single phase 2 wire system. Take resistivity of Aluminum as $2.85 \times 10^{-8} \Omega \cdot \text{mt}$	<b>07</b>
<b>Q.2</b>	(a) What is skin effect why it is absent in d.c	<b>03</b>
	(b) What is the effect of unsymmetrical spacing of conductor in three phase transmission system?	<b>04</b>
	(c) Derive the expression for the capacitance of single phase transmission line.	<b>07</b>
<b>Q.3</b>	(a) Define and explain string efficiency. Can its value be equal to 100?	<b>03</b>
	(b) Give reasons for the following : (i) A.C.S.R. conductors are preferred for transmission and distribution lines. (ii) Conductors are not fully stretched between supports	<b>04</b>
	(c) An insulator string consist of three units, each having a safe working voltage of 15kv. The ratio of self-capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find string efficiency.	<b>07</b>
<b>Q.4</b>	(a) List out line supports with its three features	<b>03</b>
	(b) What are the factors that affect the sag in the transmission line?	<b>04</b>
	(c) Discuss the various conductor material used for overhead line. What are their relative advantages and disadvantages?	<b>07</b>
<b>Q.5</b>	(a) What is the main difference between AC and DC distribution system	<b>03</b>
	(b) Derive the expression for capacitance of single core cable.	<b>04</b>
	(c) Discuss the advantages and disadvantages of (i) pin type insulator (ii) suspension type insulator	<b>07</b>
<b>Q.6</b>	(a) With neat diagram, show the various part of high voltage single core cable	<b>03</b>

- (b) What is the difference between radial, ring and interconnected distribution system? **04**
- (c) Explain the following method for cable grading: **07**  
(i) Capacitance grading (ii) Intersheath grading
- Q.7** (a) What are the advantages of per unit system **03**
- (b) How the current distribution and the voltage at various loading points can be determined in a DC ring type distribution system? **04**
- (c) A DC two wire distributor 250 m long and fed at one end is load uniformly at the rate of 1.6A/meter. Total resistance of the distributor is 0.0002 ohms/meter. Determine the voltage at the fed to maintain at 250 V. (i) at far end (ii) at the midpoint of distributor. **07**
- Q.8** (a) Define and explain primary and secondary distribution system with single line diagram **03**
- (b) Represent p.u model of transformer with and without tap changer. **04**
- (c) Derive expression for inductance per phase for 3-ph overhead transmission line when conductors are asymmetrically place but transposed **07**

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