Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2021

Subject Code:2150908 Date:14/12/2021

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	State Kalvin's law and its limitations	**03**
	(b)	Compere A.C. transmission with D.C. transmission	**04**
	(c)	What are the advantages of keeping high transmission Voltage.	**07**
Q.2	**(a)**	Explain Ferranti effect.	**03**
	(b)	Distinguish between Feeder, Distributer, Service mains. What is the criteria used for design each of them?	**04**
	(c)	What is the percentage saving in feeder copper if the line voltage in two wire D.C. system be raised from 220V to 500V for the same power to be transmitted?	**07**
		OR	
	(c)	Find the ratio of volume of copper required to given power over a given distance by overhead system using (i) d.c. 2 wire system (ii) 3 phase 3 wire system (iii) 2-phase 3 wire system.	**07**
Q.3	**(a)**	What is effect of earth on transmission line	**03**
	(b)	What do you mean by transposition of line? What is its effect on performance of line?	**04**
	(c)	Drive the equation of inductance for three phase line with symmetrical spacing.	**07**
		OR	
Q.3	**(a)**	What is the advantage of per unit system?	**03**
	(b)	Explain skin effect and proximity effect.	**04**
	(c)	Drives from basic consideration an expression of the capacitance and charging current per k.m. length of a single phase line made of two solid round conductor of radius r and spaced at D meters. Neglect the effect of ground.	**07**
Q.4	**(a)**	Explain the primary and secondary distribution with single line diagram.	**03**
	(b)	List out line support with its features.	**04**
	(c)	Two conductor of street mains AB is 500 meters long fed from both e ends at 250V. Loads of 50A, 60A, 40A and 30A are tapped at the distance of 100m, 250m, 350m, 400m from A. If the cross-section of the conductor be $1cm^2$ and specific resistance of material of the conductor is 1.7micro ohm-cm .Determine the minimum consumer voltage.	**07**
		OR	
Q.4	**(a)**	What is the difference between radial, ring man and interconnected system of distribution?	**03**
	(b)	Discuss briefly design consideration of distribution system	**04**
	(c)	A two wire feeder ABC has a load of 120A at C and 60A at B both at power factor 0.8 lagging. The impedance AB is (0.04+j0.08)	**07**

and that of BC is (0.08+j0.12) ohm. If the voltage at far end C is to be maintained at 400V, determine the voltages (i) at A (ii)at B.

Q.5	**(a)**	Give the classification of cable based on voltage	**03**
	(b)	What are A.C.S.R. conductor and why they are preferred over copper conductor for overhead transmission.	**04**
	(c)	Draw a neat sketch of the cross section of a 3-core belted high voltage cable and describe its various part.	**07**

OR

Q.5	**(a)**	What do you mean by capacitance grading of cable.	**03**
	(b)	Name the different component of transmission line. Also explain purpose for they are used.	**04**
	(c)	Explain in detail method of improving string efficiency.	**07**

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