Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2024

Subject Code:3140914 Date:29-11-2024

Subject Name: 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.**

Q.1	**(a)**	Write the advantages and disadvantages of hydro power plant.	**03**
	(b)	What is a Solar Collectors? Explain its types.	**04**
	(c)	Define tariff. Discuss the types of tariff in details.	**07**
Q.2	**(a)**	Write the advantages of high voltage transmission system.	**03**
	(b)	Draw and explain V-I Characteristics of Solar Cell.	**04**
	(c)	Explain the types of distribution systems with necessary diagrams.	**07**
		OR	
	(c)	Define power factor. Explain the methods of power factor improvement.	**07**
Q.3	**(a)**	Write the disadvantages of low power factor.	**03**
	(b)	Compare horizontal axis wind turbine and vertical axis wind turbine.	**04**
	(c)	Obtain an equation of Sag in overhead lines (i) When supports are at equal level (ii) When supports are at unequal level (iii) During effect of wind and ice loading	**07**
		OR	
Q.3	**(a)**	Define: Skin effect and Proximity effect.	**03**
	(b)	Explain the methods of increasing string efficiency.	**04**
	(c)	A high voltage transmission has distance between the leveled tower of 150 meter. Tension in the conductor is 2100 kg. Other data is as follows. (i) Wind pressure 2 kg/meter length of conductor (Ww) (ii) Specific gravity of material of conductor =10 gram/cm^3 (iii) C.S. are of the conductor = 2 cm^2 Calculate (a) Sag and (b) Vertical sag.	**07**
Q.4	**(a)**	Give the concept of GMR and GMD.	**03**
	(b)	Derive an expression for the loop inductance of a single-phase line.	**04**
	(c)	Derive the relation of inductance of 3-phase with symmetrical spacing.	**07**
		OR	
Q.4	**(a)**	What do you mean by transposition of line? What is its effect on the performance of the line?	**03**
	(b)	Explain the effect of earth on capacitance.	**04**
	(c)	A 3-phase, 50 Hz transmission lines are arranged at the corners of a triangle, the sides of which are 1m, 1.3m and 2m. Calculate the capacitance per km of the line, when the conductors are transposed. The conductors have 1.5 cm diameter.	**07**
Q.5	**(a)**	Write the classification of cables according to voltage levels.	**03**
	(b)	Explain the Grading of cables.	**04**
	(c)	Define substation. Explain the classification of substation considering different ways.	**07**

OR

Q.5	**(a)**	List out equipments which are used in transformer substation.	**03**
	(b)	Compare overhead system with underground transmission system.	**04**
	(c)	What are the different methods of neutral grounding? Explain resistance grounding with necessary diagram.	**07**

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