Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2023

Subject Code:3140914 Date:29-01-2024

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

			MARKS
Q.1	**(a)**	Name the different types of line supports.	**03**
	(b)	For a steam power plant, explain location and functions of (i) Condenser (ii) Boiler (iii) Super heater (iv) Alternator	**04**
	(c)	Give a typical layout of power system between generation and use of electrical power.	**07**
Q.2	**(a)**	Discuss the advantages and limitations of High Transmission Voltage.	**03**
	(b)	Classify different Substations in detail.	**04**
	(c)	Define and explain string efficiency. What are the various methods of improving it?	**07**
		OR	
	(c)	A transmission line has a span of 150 m between level supports. The conductor has cross sectional area of 2 cm^2. The tension in the conductor is 2000 Kg. If the specific gravity of the conductor material is 9.9 gm/c.c. and wind pressure is 1.5 Kg/m length, calculate the sag. What is the vertical sag?	**07**
Q.3	**(a)**	Enlist advantages and disadvantages of Gas power plant.	**03**
	(b)	Explain working principle of solar photovoltaic cell.	**04**
	(c)	Write short note on Nuclear Reactor.	**07**
		OR	
Q.3	**(a)**	Write site selection criteria for wind mills.	**03**
	(b)	What do you understand by base load plant and peak load plant?	**04**
	(c)	Explain with diagram elements of hydro-electric power plant.	**07**
Q.4	**(a)**	Classify underground cables.	**03**
	(b)	Explain self GMD and mutual GMD.	**04**
	(c)	Derive equation for capacitance of single phase two wire line.	**07**
		OR	
Q.4	**(a)**	Explain with neat sketch the construction of cable.	**03**
	(b)	Name the different types of insulators used in transmission system. Explain any one.	**04**
	(c)	Derive equation for inductance of three phase line with unsymmetrical spacing. Assume transposition	**07**
Q.5	**(a)**	Why is earthing necessary in power system? How can it be classified?	**03**
	(b)	Define power factor. Discuss different methods of power factor improvement.	**04**

	(c)	Discuss with neat sketches, different connection schemes of distribution systems.	**07**

OR

Q.5	**(a)**	What is tariff? Discuss maximum demand tariff.	**03**
	(b)	Enumerate types of neutral earthing and explain any one with neat sketch.	**04**
	(c)	A 2-wire dc street mains AB, 600 m long is fed from both ends at 220 V. Loads of 20A,40A, 50A and 30A are tapped at distances of 100m, 250m, 400m and 500m from the end A respectively. If the area of X-section of distributor conductor is 1 cm^2, find the minimum consumer voltage. Take $\rho = 1.7 \times 10^{-6}$ Ω cm.	**07**

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