Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3140914 Date:05-07-2024

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.**

Q.1	**(a)**	Define: (i) Load factor (ii) Demand factor and (iii) Diversity factor	**03**
	(b)	Discuss the components of nuclear reactor with their functions.	**04**
	(c)	Explain steam power plant with schematic arrangement. Also discuss the functions of main components of steam power plant.	**07**
Q.2	**(a)**	Give the classification of wind turbine power plant.	**03**
	(b)	Discuss the comparison of different types of solar collectors.	**04**
	(c)	What are the types of variable speed electric generator for wind power generation? Explain any one in detail.	**07**
		OR	
	(c)	Explain Solar Photovoltaic system. Also draw and explain V-I characteristics of solar cell.	**07**
Q.3	**(a)**	Explain power supply scheme with necessary line diagram.	**03**
	(b)	Define power factor. Discuss the causes of low power factor.	**04**
	(c)	Explain the classification of distribution systems considering different ways with diagrams.	**07**
		OR	
Q.3	**(a)**	Compare feeder, distributor and service mains.	**03**
	(b)	What are the types of insulators? Explain any one in details.	**04**
	(c)	Discuss the methods for power factor improvement with their advantages and disadvantages.	**07**
Q.4	**(a)**	Give the classification of Cables according to construction.	**03**
	(b)	What is the grading of Cables? Discuss the methods of grading of cables.	**04**
	(c)	Define substation. Explain the classification of substation in details with considering different parameters.	**07**
		OR	
Q.4	**(a)**	Differentiate neutral earthing and general earthing. Write the different grounding methods.	**03**
	(b)	Derive the relation of inductance of single phase two wire line.	**04**
	(c)	A single phase 20 Km line is 6 m above the ground with 1 cm radius of each conductor separately by a distance of 4 m horizontally. Calculate: (i)Capacitance between the conductors with effect of ground (ii) Capacitance between phase and neutral taking the presence of ground into account and (iii) Capacitance between conductors neglecting the presence of ground	**07**
Q.5	**(a)**	What is Bundled Conductor? Discuss the advantages of Bundled Conductors.	**03**
	(b)	List out equipments which are used in transformer substation with their function.	**04**

	(c)	A factory load consists of (i) an induction motor of 50 H.P (37.3 kW) with 0.8 power factor and efficiency 0.85. (ii) a synchronous motor of 25 H.P. (18.65 kW) with 0.90 power factor leading and efficiency 0.90 and (iii) lighting load at 10 kW at unity power factor. Find the annual electrical charges if the tariff is Rs. 60 per kVA of maximum demand per annum plus 5 paise per kWh. Assume the load to be steady for 2000 hours in a year.	**07**

OR

Q.5	**(a)**	Write the advantages of high transmission voltage.	**03**
	(b)	What is string efficiency? What are methods of improving string efficiency.	**04**
	(c)	Discuss the comparison between horizontal axis wind turbine and vertical axis wind turbine. Also compare fixed speed turbine with variable speed wind turbine.	**07**

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