Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2020

Subject Code:3140914 Date:03/03/2021

Subject Name:Power System- I

Time:02:30 PM TO 04:30 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
Q.1	**(a)**	Explain with schematic arrangement of steam power station.	**03**
	(b)	Explain different types of turbines used in hydro power station.	**04**
	(c)	Give comparison of steam power station and hydro power station.	**07**
Q.2	**(a)**	Explain with neat sketch the construction of cables.	**03**
	(b)	Explain advantages and disadvantages of gas turbine power plant.	**04**
	(c)	Enlist different types of nuclear reactors. Explainworking of pressurized water nuclear reactor with suitable diagram.	**07**
Q.3	**(a)**	Give comparison between conventional power plant and solar thermal power plant.	**03**
	(b)	Draw block diagram of nuclear power station and explain working of nuclear station including chain reaction.	**04**
	(c)	Write short notes on Doubly Fed Induction Generator (DFIG).	**07**
Q.4	**(a)**	Compare AC and DC supply systems.	**03**
	(b)	What are the different methods of neutral grounding? Explain solid grounding. State its advantage and disadvantages.	**04**
	(c)	With equation find out the volume of conductor in case of 3-phase 3-wire system and 3-phase 4-wire system in overhead power transmission.	**07**
Q.5	**(a)**	What is tariff? Discuss three part tariff.	**03**
	(b)	What are the factors that affect the sag in the transmission line?	**04**
	(c)	Derive condition for most economic size of conductor in an underground cable.	**07**
Q.6	**(a)**	Explain the disadvantages of low power factor.	**03**
	(b)	Differentiate between Horizontal and Vertical Axis Wind Turbine.	**04**
	(c)	What is solar photovoltaic system? Discus its major components. Also state its applications.	**07**
Q.7	**(a)**	Enlist the power factor improvement methods and describe any one method.	**03**
	(b)	Explain the advantages of high transmission line.	**04**

	(c)	Define the sag in overhead line. Derive the equation of sag in case of When supports are at equal and unequal level. Also find the sag during effect of wind and ice loading	**07**
Q.8	**(a)**	Give comparison between overhead systems versus underground transmission system.	**03**
	(b)	Explain the effect of earth on capacitance.	**04**
	(c)	Explain the inductance of three phase transmission line.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3140914 Date:28/12/2021

Subject Name:Power System- I

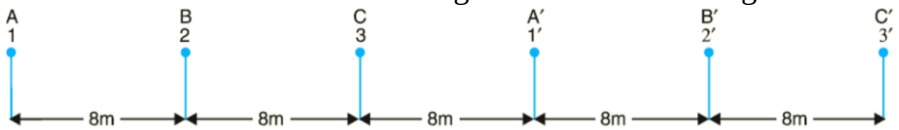
Time:10:30 AM TO 01:00 PM Total Marks: 70

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)**	For a steam power station, Describe functions of: Air Pre Heater Cooling Tower Economizer.	**03**
	(B)	Explain working principle of solar photovoltaic cell	**04**
	(C)	Draw and explain neat schematic arrangement of Hydro power station and discuss function of its constituents.	**07**
Q.2	**(A)**	Compare AC and DC supply system.	**03**
	(B)	What are the factors that affect the sag in transmission line?	**04**
	(C)	Develop various components of wind energy conversion system with diagram.	**07**
		OR	
	(C)	Explain in detail about Synchronous condenser method for power factor improvement.	**07**
Q.3	**(A)**	Name the important components of an overhead transmission line. Give reasons for unequal potential distribution over a string of suspension insulators.	**03**
	(B)	Define and explain string efficiency. Can its value be equal to 100%? Justify your answer.	**04**
	(C)	Define the sag in overhead line. Derive the equation of sag in case of When supports are at equal and unequal level. Also find the sag during effect of wind and ice loading.	**07**
		OR	
Q.3	**(A)**	Compare the merits and demerits of underground system versus overhead system.	**03**
	(B)	What are the properties of insulating material for cables? Name some insulating materials used in cables.	**04**
	(C)	What do you understand by grading of underground cables? List the methods of grading and explain any one of them in detail.	**07**
Q.4	**(A)**	What do you mean by the constants of an overhead transmission line?	**03**
	(B)	Derive the equation of Capacitance of a single phase line.	**04**

	(C)	Calculate the inductance per phase per metre for a three-phase double-circuit line whose phase conductors have a radius of 5·3 cm with the horizontal conductor arrangement as shown in Fig.	**07**



OR

Q.4	**(A)**	Explain self GMD and mutual GMD.	**03**
	(B)	Derive expression for capacitance for single core cable.	**04**
	(C)	What is electric supply system? Draw a single line diagram of a typical a.c. power supply system.	**07**
Q.5	**(A)**	Derive an expression for electric potential at a charged single conductor.	**03**
	(B)	What is the effect of earth on Transmission line capacitance?	**04**
	(C)	Classify the sub-stations according to service requirement and constructional features. Compare outdoor substation and indoor substation	**07**

OR

Q.5	**(A)**	Enlist various equipment's used in substation	**03**
	(B)	What is neutral grounding? List the advantages of Neutral grounding.	**04**
	(C)	Explain arc suppression coil earthing in detail.	**07**

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2021

Subject Code:3140914 Date:09/09/2021

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.**

			MARKS
Q.1	**(a)**	Define: Load factor, Demand factor and Diversity factor.	**03**
	(b)	Discuss present power generation scenario in Gujarat and India with presenting proper data.	**04**
	(c)	Explain the steam power station with neat schematic diagram. Also discuss advantages and disadvantages of steam power station. Also write the points, which are considered during the site selection of steam power plant.	**07**
Q.2	**(a)**	Explain load curve and load duration curve with their importance.	**03**
	(b)	Compare steam power plant, hydro power plant and nuclear power plant.	**04**
	(c)	Explain nuclear power plant with proper diagram. Also discuss advantages and disadvantages of nuclear power plant.	**07**
		OR	
	(c)	A synchronous motor improves the power factor of a load of 200 kW from 0.8 lagging to 0.9 lagging. Simultaneously the motor carries a load of 80 kW. Find (i) the leading kVAR taken by the motor (ii) kVA rating of the motor and (iii) power factor at which the motor operates.	**07**
Q.3	**(a)**	Write merits and demerits of wind energy. Write the types of wind energy system.	**03**
	(b)	Differentiate between horizontal and vertical axis wind turbine.	**04**
	(c)	What is power factor? Discuss the methods of power factor improvement.	**07**
		OR	
Q.3	**(a)**	Define tariff. Write the types of tariff.	**03**
	(b)	Discuss the comparison of overhead transmission system with underground transmission system.	**04**
	(c)	Explain Photovoltaic cell for electrical power generation. Write applications of solar energy.	**07**
Q.4	**(a)**	What are the causes of low power factor?	**03**
	(b)	What is string efficiency? Explain methods of improving string efficiency.	**04**
	(c)	Calculate the capacitance of a 100 km long 3-phase, 50 Hz overhead transmission line consisting of 3 conductors, each of diameter 2 cm and spaced 2.5 m at the corners of an equivalent triangle.	**07**

OR

Q.4	**(a)**	Compare indoor substation with outdoor substation.	**03**
	(b)	Explain the methods of neutral grounding.	**04**
	(c)	Define substation. Explain the classification of substation considering different ways.	**07**
Q.5	**(a)**	Write types of cable considering voltage and insulating materials.	**03**
	(b)	What is a sag in overhead lines? Discuss the disadvantages of providing too small or too large sag on a line.	**04**
	(c)	Derive an expression for the capacitance of a single phase overhead transmission line.	**07**

OR

Q.5	**(a)**	List out the main components of overhead lines. Also write the types of insulators.	**03**
	(b)	Derive an expression for the loop inductance of a single phase line.	**04**
	(c)	Explain methods of distribution systems with necessary diagrams.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2022

Subject Code:3140914 Date:06-07-2022

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)**	Enlist various equipments used in substation.	**03**
	(b)	Explain pole mounted substation with suitable figure.	**04**
	(c)	Give comparison of steam power station and hydro power station.	**07**
Q.2	**(a)**	Explain with neat sketch the construction of cables.	**03**
	(b)	What are the properties of insulating material for cables? name some insulating materials used in cables	**04**
	(c)	Enlist different types of nuclear reactors. Explain working of pressurized water nuclear reactor with suitable diagram.	**07**
		OR	
	(c)	A 3-phase transmission line being supported by three-disc insulators. The potential across top unit and middle unit are 8 kV and 11kV respectively. Calculated (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) the line voltage and (iii) string efficiency.	**07**
Q.3	**(a)**	Why starting motor is used in gas turbine power station? What is the main difference between open cycle and combine cycle gas power plant?	**03**
	(b)	Drawblock diagram of nuclear power station and explain working of nuclear station including chain reaction.	**04**
	(c)	What is string efficiency? Derive its equation in case of 3-disc string.Explain methods of improving string efficiency	**07**
		OR	
Q-3	**(a)**	Compare AC and DC supply systems.	**03**
	(b)	What are the different methods of neutral grounding? Explain solid grounding. State its advantage and disadvantages.	**04**
	(c)	With equation find out the volume of conductor in case of 3-phase 3-wire system and 3-phase 4-wire system in overhead power transmission.	**07**
Q-4	**(a)**	What is tariff? Discuss three part tariff.	**03**
	(b)	What are the factors that affect the sag in the transmission line?	**04**
	(c)	Derive condition for most economic size of conductor in an underground cable.	**07**

OR

Q-4	**(a)**	Explain the disadvantages of low power factor.	**03**
	(b)	Differentiate between Horizontal and Vertical Axis Wind Turbine.	**04**
	(c)	What is solar photovoltaic system? Discus its major components. Also state its applications.	**07**
Q-5	**(a)**	Enlist the power factor improvement methods and describe any one method.	**03**
	(b)	Explain the advantages of high voltage transmission line.	**04**
	(c)	Define the sag in overhead line. Derive the equation of sag in case of When supports are at equal and unequal level. Also find the sag during effect of wind and ice loading	**07**

OR

Q-5	**(a)**	What do you mean by transposition of line? What is itseffect on the performance of the line?	**03**
	(b)	Explain the effect of earth on capacitance.	**04**
	(c)	Explain the inductance of three phase transmission line.	**07**

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