

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023

Subject Code:3142404**Date:11-07-2023****Subject Name:Basic Power System Engineering****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.
5. Figures to the right indicate full marks (M) & Course Outcome (CO).

		MARKS
Q.1	(a) State the factors to be taken into consideration for the selection of Hydro Power Station.	03
	(b) What are the various types of turbines used for hydro power generation? Categorise them according to length.	04
	(c) Discuss about the Air preheater, Economiser and Superheater of thermal power station.	07
Q.2	(a) Discuss various disadvantages of low power factor.	03
	(b) Enlist different methods of power factor improvement and explain any one in detail.	04
	(c) A 3-phase 50-Hz 400V motor develops 100 HP (74.6 kW), the power factor being 0.75 lagging and efficiency 93%. A bank of capacitor is connected in delta across the supply terminals and power factor raised to 0.95 lagging. Each of capacitance units is built of 4 similar 100V capacitors. Determine the capacitance of each capacitor.	07
OR		
	(c) A single-phase motor connected to a 240V, 50Hz, supply takes 20A at a power factor of 0.75 lagging. A capacitor is shunted across the motor terminals to improve the power factor to 0.9. Determine the capacitance of the capacitor to be used.	07
Q.3	(a) Give the classification of various substations and discuss about the transformer substation.	03
	(b) Explain underground substation.	04
	(c) Draw and explain the typical layout of electrical power system from generation to distribution.	07
OR		
Q.3	(a) Enlist the criteria to be taken into consideration for the selection of site for nuclear power station.	03
	(b) What is the importance of control rods and moderator in nuclear reactor?	04
	(c) Compare the thermal, hydro and nuclear power plants	07
Q.4	(a) Derive equation for capacitance for the three phase line with symmetrical spacing.	03
	(b) Derive equation for inductance of single-phase two wire line.	04
	(c) Explain sending end circle diagram.	07
OR		
Q.4	(a) Discuss on the various conductor materials used for overhead lines. What are their relative advantages and disadvantages?	03
	(b) Explain transposition of transmission line.	04
	(c) Explain receiving end circle diagram.	07

- Q.5** (a) Enlist the basic equipment used in HVDC transmission. **03**
(b) Explain the operation of converters in HVDC transmission systems. **04**
(c) Write the principle of HVDC transmission. Explain its operation and control techniques with the help of block diagram. **07**
- OR**
- Q.5** (a) Explain bundled conductors. **03**
(b) Explain skin effect and Ferranti effect. **04**
(c) Explain the solar plant through block diagram. Discuss importance of various blocks. **07**
