

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- IV EXAMINATION – SUMMER 2026****Subject Code:3140914****Date:02-06-2026****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) What is tariff? Write short note on two port tariff.	03
	(b) Explain how tip speed of rotor affects the performance of a wind turbine rotor.	04
	(c) List out causes for low power factor. With necessary diagram explain how synchronous condenser can improve the power factor along with its advantages and disadvantages.	07
Q.2	(a) Discuss advantages and disadvantages of suspension type insulators. Where it is used in power system?	03
	(b) Explain equivalent circuit of a solar cell. Also give performance characteristics of solar cell.	04
	(c) Define string efficiency. Derive equation of string efficiency for a three disc string.	07
	OR	
	(c) Derive an approximate expression for sag in an overhead lines when supports are at unequal levels.	07
Q.3	(a) Briefly explain an overhead transmission line parameters.	03
	(b) Two conductors of a single phase line, each of 1 cm diameter, are arranged in a vertical plane with one conductor mounted 1 m above the other. A second identical line is mounted at the same height as the first and spaced horizontally 0.25 m apart from it. The two upper and the two lower conductors are connected in parallel. Determine the inductance per km of the resulting double circuit line.	04
	(c) Derive an equation for line to neutral capacitance for a 3-phase overhead transmission line when the conductors are symmetrically placed.	07
	OR	
Q.3	(a) What is skin effect? Why it is absent in DC system?	03
	(b) With a neat diagram, show the various parts of a high voltage single core cable.	04
	(c) Show that maximum stress in a single-core cable is $\frac{2V}{d \log_e D/d}$.	07
Q.4	(a) Give comparison of outdoor sub-station and indoor sub-station.	03
	(b) What do you mean by transposition of line and what is its effect?	04
	(c) Draw schematic diagram of steam power station. Explain in brief function of (1) Super heater, (2) Economiser and (3) ID-FD fan	07
	OR	
Q.4	(a) What is neutral grounding? What are the advantages of neutral grounding?	03
	(b) Write short note on capacitance grading.	04
	(c) Give comparison of hydro power plant, nuclear power plant and gas turbine power plant.	07

- Q.5 (a)** Discuss different ways to classifying the sub-stations. **03**
- (b)** Describe ungrounded or isolated neutral system. What are its disadvantages? **04**
- (c)** A single-phase a.c. distributor AB is fed from end A and has total impedance of $(0.2 + j0.3)$ ohm. At the far end, the voltage $V_B = 240$ V and the current is 100 A at a power factor of 0.8 lagging. At the mid-point M, a current of 100 A is tapped at a power factor of 0.6 lagging with reference to the voltage V_M at the mid-point. Calculate the supply voltage V_A and phase angle between V_A and V_B . **07**

OR

- Q.5 (a)** Write short note on sub-station equipment. **03**
- (b)** Write short note on resonant grounding. **04**
- (c)** Non-reactive loads of 10 kW, 6 kW and 4 kW are connected between the neutral and red, yellow and blue phases respectively of a 3-phase, 4-wire 400/230 V supply. Find the current in each line and in the neutral wire. **07**
