

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV(NEW) EXAMINATION – WINTER 2022****Subject Code:3140914****Date:19-12-2022****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) Define: i) load curve ii) load duration curve iii)base load	03
(b) Illustrate hydro power station with neat diagram.	04
(c) Solve an equation for most economical value of power factor which may be attained by a consumer.	07
Q.2 (a) Show that in string of suspension insulators, the disc nearest to conductor has the highest voltage across it.	03
(b) Explain construction and working of DFIG.	04
(c) In a 66 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, Calculate (i) the distribution of voltage over 3 insulators and (ii) string efficiency.	07
OR	
(c) Obtain an equation of sag in overhead lines.	07
i)When supports are at equal level.	
ii) When supports are at unequal level.	
iii)during effect of wind and ice loading	
Q.3 (a) Define: Transposition of conductor & list out its advantages.	03
(b) Calculate the capacitance of a 100 km long 3-phase, 50 Hz overhead transmission line consisting of 3 conductors, each of diameter 4 cm and spaced 2.5 m at the corners of an equilateral triangle.	04
(c) Evaluate an expression for electric potential	07
(i) at a charged single conductor	
(ii) at a conductor in a group of charged conductors	
OR	
Q.3 (a) Define: bundle conductor & list out its advantages.	03
(b) Derive an expression for the loop inductance of a single phase line.	04
(c) Deduce an expression for line to neutral capacitance for a 3-phase overhead transmission line when the conductors are	07
(i) symmetrically placed	
(ii) unsymmetrically placed but transposed	
Q.4 (a) Compare the merits and demerits of underground system versus overhead system.	03
(b) Explain desirable characteristics of insulating materials used in cables.	04
(c) Explain with neat sketch the construction of cables.	07
OR	
Q.4 (a) Classify cables.	03
(b) Explain methods of grading.	04

- (c) Determine condition for most economic size of conductor in an underground cable. **07**
- Q.5** (a) Enlist various equipment's used in substation **03**
(b) Explain single bus bar arrangement in substation with neat diagram. **04**
(c) Distinguish between a.c and d.c transmission. **07**
- OR**
- Q.5** (a) Define: Neutral grounding. List out advantages of neutral grounding. **03**
(b) Explain transformer grounding. **04**
(c) Evaluate an equation for the volume of conductor in case of 3-phase 3-wire system and 3-phase 4-wire system in overhead power transmission. **07**
