Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII • EXAMINATION – WINTER • 2014

Subject Code: 180903 Date: 02-12-2014

Subject Name: Power System Practice and Design

Time: 02:30 pm - 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.**

Q.1 **(a)** What are corona losses? Explain Peek's and Peterson's formula for calculating the corona loss. What is the permissible limit? **07**

(b) What do you mean by compensation with refer to transmission line? Explain series compensation. **07**

Q.2 **(a)** Discuss the following factors to be taken into consideration in the mechanical design of a transmission line. **07**

(1) Clearance from the ground
(2) Earthing
(3) Span, sag

(b) Explain the role of Kelvin's law for the selection and size of feeders. **07**

OR

(b) Explain any one method of measuring soil resistivity and earthing resistance. **07**

Q.3 **(a)** Define basic insulation level. Explain the insulation levels of substation equipment. **07**

(b) Determine ABCD constants and regulation of 3-phase transmission line considering following data. **07**

Power = 85,000 kw, power factor = 0.85 lagging, Distance = 160 km, voltage =230 KV, spacing of conductors= 10.2 m, Resistance/km = 0.21 Ω, outer radius R = 0.827 cm, Self GMD= 0.768 R

OR

Q.3 **(a)** Explain the different issues related with interconnections between grid and Solar PV. **07**

(b) Write a short note on Lamp flickering. **07**

Q.4 **(a)** Explain the following distribution system with figures. **07**

(1) Ring System
(2) Network (Grid) system

(b) Draw and explain schematic diagram of HVDC system. Discuss various types of HVDC link. **07**

OR

Q.4 **(a)** The following loads are connected to a three phase four wire 415/230 V distribution system. **07**

(1) A three phase 12 KW load at 0.85 power factor lagging.
(2) A three phase 9 KW load at unity power factor.
(3) A single phase 1.2 KW load at 0.85 power factor lagging between the phase R and neutral.
(4) A single phase 2.5 KW load at 0.9 power factor leading between the phase Y and neutral.
(5) A single phase 2 KW load at unity power factor between the phase B and neutral.

The phase sequence is RYB. Calculate the currents in each line and current in Neutral.

	(b)	Explain the factors while considering choice and spacing of conductors for transmission line design.	**07**
Q.5	**(a)**	Explain the merits and demerits of HVDC transmission system.	**07**
	(b)	Explain the design of cables considering the ampere capacity.	**07**

OR

Q.5	**(a)**	Explain the different types of EHV towers. List out the EHV systems in INDIA.	**07**
	(b)	Explain the working principle of Lightning Arrester. Explain the construction of Horn Gap type Arrester.	**07**

****