

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER – VIII (OLD) • EXAMINATION – WINTER 2017**

**Subject Code: 180903****Date: 07/11/2017****Subject Name: Power System Practice and Design****Time: 02.30 to 05.00****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) Discuss the following with respect to electrical design of transmission line. **07**  
(1) Choice of voltage (2) Selection of conductor size (3) Span and number of Circuit (4) SIL.
- (b) Explain classification of lamp-flicker and remedies for reducing lamp-flicker. **07**
- Q.2** (a) What are corona losses? Explain Peek's and Peterson's formula for calculating the corona loss. What is the permissible limit? **07**
- (b) Explain the role of Kelvin's law for the selection and size of feeders. **07**
- OR**
- (b) A 2-wire feeder carries a constant current of 250 A throughout the year. The portion of capital cost which is proportional to area of cross-section is Rs. 5 per kg of copper conductor. The interest and depreciation total 100 % per annum and the cost of energy is 5 P per kWh. Find the most economic area of cross-section of the conductor. Given that the density of copper is  $8.93 \text{ gm/cm}^3$  and its specific resistance is  $1.73 \times 10^{-8} \Omega\text{-m}$ . **07**
- Q.3** (a) What is a stringing chart? What method is used for stringing the line conductors on the supports? What is the effect of temperature and the modulus of elasticity on the tension of the line? **07**
- (b) Explain the following distribution system with figures. **07**  
(1) Radial system  
(2) Parallel or Loop system  
(3) Network or Grid system
- OR**
- Q.3** (a) Explain main considerations in mechanical design of transmission line. **07**
- (b) Explain the design considerations for EHV transmission lines. **07**

- Q.4 (a)** The following loads are connected to a three-phase four-wire, 400/230 V distribution system. The phase sequence of the system is RYB. Calculate (a) the current in each line and the current in the neutral. (b) Draw the phasor diagram. **07**

Sr. No.	Load type	Load (kW)	Power Factor
1	Three-phase	16	0.8 (lagging)
2	Three-phase	10	1.0
3	Single-phase (R-n)	2	0.9 (lagging)
4	Single-phase (Y-n)	3	0.8 (leading)
5	Single-phase (B-n)	5	1.0

- (b)** Explain the methods of designing primary distribution system with reference to **07**  
 (1) Choice of voltage (2) Conductor size (3) Type of distribution system  
 (4) Voltage drop

**OR**

- Q.4 (a)** Explain touch potential and step potential. How to measure soil resistivity? **07**  
**(b)** Draw substation layout. Explain each component of layout. **07**

- Q.5 (a)** Explain the merits and demerits of HVDC transmission system. **07**  
**(b)** Comment upon the location of the lightning arrester in a substation. Justify your answer. **07**

**OR**

- Q.5 (a)** Explain Radio and Television interference. **07**  
**(b)** Write a note on insulation co-ordination and basic insulation levels adopted for EHV lines and equipment. **07**

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