

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2180903

Date:15/05/2019

Subject Name:Power System Planning and Design

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.

- Q.1**
- (a) Explain surge impedance loading. **03**
 - (b) Explain factor while consideration choice and spacing of it in transmission line design. **04**
 - (c) Explain use of bundle conductors in EHV transmission lines. Discuss spacing and selection of number of conductors for EHV lines. **07**
- Q.2**
- (a) Explain corona. **03**
 - (b) Differentiate between shunt and series compensation. **04**
 - (c) State and explain kelvin's law for most economical size of conductor. **07**
- OR**
- (c) What method adopted to reduce tower footing resistance? **07**
- Q.3**
- (a) What is lamp flicker? What are its causes? **03**
 - (b) Explain factor to be considered for selection of size and location of generating stations. **04**
 - (c) A 2 wire dc distributor AB is fed from both ends. At the feeding point A voltage is maintained at 240 V and at feeding point B voltage 254V. The total length of distribution is 200 meters and load are tapped off as under: 25 A at 50 meters from A; 50 A at 75 meters from A; 30 A at 100 meters from A; 40 A at 150 meters from A. If the resistance per km of one conductor is 0.3 ohm. Calculate (I) The current in the various sections of the distributor. (II) The minimum voltage and the point at it occur. **07**
- OR**
- Q.3**
- (a) Explain critical disruptive voltage. **03**
 - (b) Explain the difference between ring and radial type distribution system. **04**
 - (c) A single AC distributor ABCD of length 400 meter, determine the voltage drop over the distributor if various currents tapped are as under. **07**
 - (1) At point B, 100 meter from A, 100 amp at 0.707 pf lagging.
 - (2) At point C, 250 meter from A, 125 amp at unity pf.
 - (3) At point D, 400 meter from A, 80 amp at 0.8 pf lagging.
 Point A is feeding point and impedance is $(0.25+j0.125)$ per km run (go and return)
- Q.4**
- (a) Explain clearance from ground in mechanical design of transmission line. **03**
 - (b) Explain methods of power system planning. **04**
 - (c) Discuss various considerations in location of substations. **07**
- OR**
- Q.4**
- (a) Explain reliability of electrical power system. **03**
 - (b) Explain radio and television interference. **04**
 - (c) Write a short note on power system improvement scheme. **07**
- Q.5**
- (a) Explain step and touch potential. **03**

- (b) Explain location of lightning arrester. **04**
(c) Explain design of substation earthing grid. **07**

OR

- Q.5** (a) Write down the causes for high power losses in the distribution and sub transmission system. **03**
(b) Explain voltage transformer earthing. **04**
(c) Write a short note on insulation co-ordination and basic insulation levels adopted for EHV lines and equipment. **07**

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