

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII (old) - EXAMINATION – SUMMER 2018

Subject Code:180903

Date:02/05/2018

Subject Name:Power System Practice 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) Discuss classification of distribution systems with neat diagrams. What are the advantages and dis-advantages of each? **07**
- (b) Enlist the steps to be followed for the construction of receiving end and sending end power circle diagram. How the losses are determined from receiving end diagram? **07**
- Q.2** (a) Define critical disruptive voltage and visual critical voltage. How Corona loss can be determined? What is significance of Corona in the design of transmission line? **07**
- (b) Determine ABCD constants and Regulation of 3-phase Transmission line considering following data. **07**
Power = 85,000 kW, p.f.= 0.9 lagging, Distance = 160 km, Voltage = 230 kV, Spacing of conductors = 10.2 m, Resistance/km = 0.22 Ω , outer radius R = 0.827 cm, Self GMD = 0.768 R.
- OR**
- (b) A single phase a.c. distributor 500 m long has a total loop impedance of $(0.02 + j0.04) \Omega$ and is fed from one end at 250 V. It is loaded as under: **07**
1. 50 A at unity power factor, 200 m from the feeding point.
2. 100 A at 0.8 power factor lag, 300 m from the feeding point.
3. 50 A at 0.6 power factor lag, at the far end.
Calculate the total voltage drop in the distributor and the voltage at the far end.
- Q.3** (a) State and explain Kelvin's law for the most economical cross section of conductor. **07**
- (b) The cost of two core feeder cable, including installation is $(90a + 10)$ per metre & interest and depreciation charges are 15%. The cable 1 km in length and cost of energy is 3 paise per unit. Maximum current in the feeder is 260 A and demand is such that copper loss is equivalent to that would be produced by full current flowing for 6 months. If resistance of conductor of 1 sq. cm. and 1 km length is 0.173 ohm. Calculate most economical cross sectional area. **07**
- OR**
- Q.3** (a) What is lamp flicker? What are its causes? What type of loads are responsible for it? How can it be reduced? **07**
- (b) Explain the steps involve in the lightning arrester selection. Highlight the effect of earthing for selecting voltage rating of the arrester. **07**
- Q.4** (a) Define Insulation Coordination. Explain Insulation Co-ordination curves. **07**
- (b) What methods are adopted to reduce the tower footing resistance. **07**
- OR**
- Q.4** (a) What is stringing chart? How the preliminary design of tower is carried out? **07**
- (b) Discuss applications of HVDC systems **07**
- Q.5** (a) Write a brief note on Gas Insulated Substation **07**
- (b) Explain the various types of DC link. Name some HVDC systems in India and its Future. **07**

OR

- Q.5** (a) What are the limitations of HVAC transmission? Give the applications of HVDC system. **07**
- (b) What is earth resistance ?Why its value should be as low as possible ?How it is measured with voltmeter-ammeter method ? **07**
