

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII EXAMINATION – SUMMER 2016****Subject Code:180903****Date:07/05/2016****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 the following with respect to design of transmission line. **07**
 (1) Choice of voltage (2) Selection of conductor size (3) Span and number of Circuit (4) SIL
- (b)** It is proposed to transmit a three phase power of 100 MW at 0.9 p.f. lagging at 50 Hz over a distance of 200 Km. Voltage selected is 220 KV. ACSR GOAT conductor selected has specifications as 30/7/3.71mm, overall diameter 25.97 mm, current carrying capacity 680 amp and resistance at 20^o C is 0.0898 ohm/Km. For conductor spacing of 6 mt and horizontal configuration of conductor, determine voltage drop and efficiency (neglect corona loss). Consider resistance for determining performance as 75^o C. Take resistance temperature coefficient for conductor as 0.00438 at 0^o C. Consider line as medium transmission line having nominal pi configuration. **07**
- Q.2 (a)** 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**
- (b)** 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**
- OR**
- (b)** What is stringing chart? How the preliminary design of tower is carried out? **07**
- Q.3 (a)** Explain the methods of designing primary distribution system with reference to (1) Choice of voltage (2) Conductor size (3) Type of distribution system (4) Voltage drop **07**
- (b)** The daily load cycle of a three phase transmission line 20 Km long is equivalent to a current of 100 amp for 8 hrs, 75 amp for 7 hrs and 20 amp for 9 hrs. The capital cost per Km of line per conductor is Rs (9500 + 24000/a) where a is cross sectional area in cm² of the conductor. Find the most economical size for the conductor assuming interest and depreciation of 10 % per annum and cost of energy wasted is 5 paisa per KWh. Resistance of each conductor per Km length is 0.19/a ohms. **07**
- OR**
- Q.3 (a)** For single phase AC distributor A B C D of length 400 mt, determine the total voltage drop over the distributor if various currents tapped are as under. **07**
 (1) At point B, 100 mt from A, 100 amp at 0.707 p.f. lagging
 (2) At point C, 250 mt from A, 125 amp at UPF.
 (3) At point D, 400 mt from A, 80 amp at 0.8 p.f. lagging
 Point A is feeding point and impedance is (0.25 + j0.125) per Km run (go and return).
- (b)** Write notes on (1) Lamp flicker (2) Difference between AC and DC LT distribution system design. **07**

- Q.4 (a)** Define earth electrode and earth current .Explain step potential ,touch potential and transferred potential. **07**
- (b)** Discuss the following with respect to EHV transmission line. **07**
- (1) Environmental aspects in design of EHV lines
 - (2) Use of bundled conductors.
- OR**
- Q.4 (a)** What is earth resistance ?Why its value should be as low as possible ?How it is measured with voltmeter-ammeter method ? **07**
- (b)** Explain the main considerations for planning and designing generating stations in power system with reference to (1) size of units (2)different types of generating plants (3) choice of generator reactance and constants. **07**
- Q.5 (a)** Explain the steps involve in the lightning arrestor selection. Highlight the effect of earthing for selecting voltage rating of the arrestor. **07**
- (b)** What are the limitations of HVAC transmission? Give the applications of HVDC system. **07**
- OR**
- Q.5 (a)** Explain the various types of DC link. Name some HVDC systems in India and its future. **07**
- (b)** Define dry flash over voltage , wet flashover voltage and impulse flash over voltage .Explain the insulation coordination curve. **07**
