

**GUJARAT TECHNOLOGICAL UNIVERSITY****PDDC SEM-IV Examination-Nov-2011****Subject code: X40903****Date: 25/11/2011****Subject Name: Power System Analysis and Simulation****Time: 2.30 pm -5.00 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) Derive the equations for transmission line. **07**  

$$V_s = V_r \cosh \gamma l + I_r Z_c \sinh \gamma l$$

$$I_s = V_r \frac{\sinh \gamma l}{Z_c} + I_r \cosh \gamma l$$
- (b) Show that  $AD-BC = 1$  for transmission line. **07**
- Q.2** (a) Explain propagation constant  $\gamma$  and surge impedance for transmission line. **07**
- (b) A balanced load of 3 impedances each  $(6 + j9)$  is supplied through line having an impedance of  $(1 + j2)$  ohm. The supply voltage is 400 volts 50Hz. Determine the power input and output when the load is connected in star. **07**
- OR**
- (b) Explain: 1. Skin effect. 2. Ferranti effect. **07**
- Q.3** (a) Explain the importance of bundled conductors in transmission. **07**
- (b) What is importance of surge impedance loading **07**
- OR**
- Q.3** (a) State the advantages of per unit values. **07**
- (b) Explain shunt compensation of transmission lines. **07**
- Q.4** (a) The line current in amperes in phases a, b and c respectively are  $500 + j150$ ,  $100 - j600$  and  $-300 + j600$  referred to the same reference vector. Find the symmetrical components of current. **07**
- (b) What is the importance of symmetrical components? **07**
- OR**
- Q.4** (a) State the corona characteristics. Discuss visual and disruptive corona. **07**
- (b) Which are the different types of grounding? How the modern power station generator neutral grounding is done? **07**
- Q.5** (a) How the sequence networks are connected for LG, LL and LLG fault calculation. **07**
- (b) A 25 MVA, 13.2 kV, alternator with solid grounding has sub-transient reactance of 0.25 p.u., the -ve and zero sequence reactance are 0.35 and 0.1 p.u. respectively. A single line to ground fault occurs at a terminal of generator. Determine fault current. **07**
- OR**
- Q.5** Explain effect of transformer connections on its zero sequence networks. **14**

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