

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-III Examination-Dec.-2011

Subject code: 132401**Date: 17/12/2011****Subject Name: Basic Power System Engineering****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) Draw the schematic arrangement of nuclear power station and explain in detail. **07**
(b) Explain the basics of symmetrical component transformation. Derive equations of V_{a1} , V_{a2} , and V_{a0} . **07**
- Q.2** (a) Define neutral grounding. List advantages of neutral grounding. Explain voltage transformer earthing method with its advantages, disadvantages and applications. **07**
(b) Draw the schematic arrangement of hydro-electric power plant. List the different parts of hydraulic structure and explain each in detail. **07**
- OR**
- (b) Explain circuit behavior of ungrounded neutral system under normal condition and single line to ground fault. **07**
- Q.3** (a) Derive expressions of inductance for three-phase overhead transmission line with unsymmetrical conductor spacing. **07**
(b) Explain the Skin effect, Proximity effect and Ferranti effect in brief. **07**
- OR**
- Q.3** (a) Explain in brief the potential of a long straight conductor. Derive an expression for the capacitance of a single-phase two wire line. **07**
(b) Explain the double-circuit three-phase line in detail. Derive necessary equations. **07**
- Q.4** (a) Define PU system. List the advantages of it. Derive the equation of base impedance for single-phase and three-phase system. Discuss the change of base. **07**
(b) Explain the disadvantages of low power factor. Explain the calculation of power factor correction with necessary diagram. **07**
- OR**
- Q.4** (a) Discuss the importance of power factor improvement. Derive the expression of most economical power factor. **07**
(b) Explain the performance of single-phase short transmission line in detail. **07**
- Q.5** (a) List the advantages and disadvantages of HVDC transmission system. **07**
(b) A 3-phase, 50 Hz, 132 kV overhead line has conductors placed in a horizontal plane 4 m apart. Conductor diameter is 2 cm. If the line length is 100 km, calculate the charging current per phase assuming the complete transposition. **07**
- OR**
- Q.5** (a) Explain the principle of HVDC transmission. Explain the operation and control of HVDC transmission system with block diagram. **07**
(b) Explain the Nominal π method used for the solution of medium transmission line. **07**
