

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-IV Examination-Nov/Dec-2011

Subject code: 140902**Date: 28/11/2011****Subject Name: Electrical Power****Time: 02.30 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) Describe with help of a neat sketch the working of solar power plant. **06**
- (b) Explain the essential factors which influence the choice of site for steam power station. **04**
- (c) Discuss advantage and disadvantage of hydroelectric plant. **04**
- Q.2** (a) Explain with a neat sketch the various parts of nuclear reactor. **07**
- (b) Explain the working of a gas turbine power plant with a schematic diagram **07**
- OR**
- (b) Draw the schematic diagram of a steam power station. **07**
- Q.3** (a) Derive the equation for inductance of three phase line with unsymmetrical spacing **07**
- (b) A two conductor single phase transmission line operates at 50 Hz. The diameter of each conductor is 20mm and spacing between conductors is 3m. Calculate (i) Loop inductance of line per km (ii) inductance of each conductor per Km (iii) inductive reactance per km **07**
- OR**
- Q.3** (a) Derive equation for capacitance of single phase two wire line. **07**
- (b) A three phase 50 Hz line consists of three conductors each of diameters 21 mm. The spacing between conductors is as follows.
Spacing between A & B is 3m
Spacing between B & C is 5m
Spacing between C & A is 3.6m
Find the capacitance and capacitive reactance per km of line. **07**
- Q.4** (a) Explain various types of insulators used for overhead lines. **07**
- (b) Each line of a 3 phase system is suspended by a string of 3 similar insulators. If the voltage across the line unit is 17.5 kV, calculate the string efficiency. Assume that the shunt capacitance between each insulator and earth is $1/8^{\text{th}}$ of the capacitance of the insulator itself. **07**
- OR**
- Q. 4** (a) Explain the different types of distribution system with diagram. **07**
- (b) Explain function of the major equipment installed in the substation. **07**

- Q.5**
- (a) Explain ferranti effect. **04**
 - (b) Discuss the disadvantage of low power factor. **04**
 - (c) Explain the various methods for power factor improvement. **06**
- OR**
- Q.5**
- (a) Explain following methods of earthings with diagram **07**
 - (i) Arc suppression coil earthing
 - (ii) Voltage transformer earthing.
 - (b) Explain effect of earth on capacitance of a line. Derive expression for capacitance of single phase line taking into account the effect of earth. **07**
