

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – III • EXAMINATION – WINTER 2012****Subject code: 132401****Date: 05-01-2013****Subject Name: Basic Power Systems engineering****Time: 10.30 am – 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) Brief the following components used in power systems. **07**
(1) Breaker (2) Isolator (3) Fuses
- (b) Define Power Factor. Explain the Power Triangle and deduce necessary formula from it. State the causes of low power factor. **07**
- Q.2** (a) Derive expressions of inductance for three phase overhead transmission line with unsymmetrical conductor spacing. **07**
- (b) Explain the transposition of transmission line. **07**
- OR**
- (b) What is flux linkage? Find an expression for the flux linkages due to a single current carrying conductor. **07**
- Q.3** (a) Draw and explain the schematic diagram of Hydro power station. **07**
- (b) Explain the principle of HVDC transmission. Explain the operation and control of HVDC transmission system with Block diagram. **07**
- OR**
- Q.3** (a) Draw and explain the schematic diagram of Thermal power station. **07**
- (b) Explain the Skin effect, Proximity effect and Ferranti effect in brief. **07**
- Q.4** (a) What is Grounding? What are its advantages? **07**
- (b) State and define symmetrical components with neat diagram. **07**
- OR**
- Q.4** (a) What is reactance grounding? What are advantages and disadvantages? **07**
- (b) Explain Peterson coil grounding and grounding of transformer. **07**
- Q.5** (a) State various methods for power factor improvement. Explain power factor correction by static capacitors. **07**
- (b) A single phase Hz motor takes 20 A at 0.75 power factor lagging from a 230 V sinusoidal supply. Calculate the KVA_r and capacitance of a capacitor to be connected in parallel to raise the power factor to 0.99 lagging. What the new supply current? **07**
- OR**
- Q.5** (a) Define PU system. List the advantages of it. Derive the equation of base impedance for single-phase and three-phase system. **07**
- (b) A 3-phase 3-wire system has its conductors arranged at the corners of an equilateral triangle of 2 m side, the diameter of each conductor is 2.5 cm. Calculate the inductance and capacitance of each conductor. **07**
