

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III(Power Electronics)Examination December 2009****Subject code:132401 Subject Name: Basic Power Systems Engineering****Date:23/12/2009****Time: 11:00 am -1:30 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) Define Power Factor. Discuss causes of Low Power Factor and state disadvantages of low power factor. **07**

(b) State various methods for power factor improvement. Describe these methods. **07**

Q.2 (a) Derive the expression for the most economical value of power factor which may be attained by a consumer. State advantages of power factor close to unity. **07**

(b) What is skin effect? Explain how it affects AC transmission line as compared to DC transmission line. **07**

OR

(b) Define & Explain PU representation of Power System. State its advantages. **07**

Q.3 (a) Derive an expression for the capacitance of a 1- Φ overhead transmission line. Deduce an expression for line to neutral capacitance for a 3- Φ overhead transmission line when conductors are symmetrically placed. **07**

(b) Draw the schematic diagram of a Nuclear power station and discuss its operation. **07**

OR

Q.3 (a) Derive an expression for the loop inductance of a 1- Φ line. Also derive expression for the inductance per phase of a 3- Φ overhead transmission line when conductors are symmetrically placed. **07**

(b) Draw the schematic diagram of a hydro-electric power plant and explain the function of various components. **07**

Q.4 (a) Compare HVDC and AC transmission system stating their relative advantages and disadvantages. **07**

(b) What is circuit breaker? Describe its operating principle. State difference between circuit breaker and fuse. **07**

OR

Q.4 (a) State & explain in brief various methods of neutral grounding. **07**

(b) Draw the schematic diagram of a modern steam power station and explain its operation. **07**

Q.5 (a) What is fuse? Discuss advantage and disadvantages of a fuse. **07**

(b) State and define symmetrical components with neat diagram. **07**

OR

Q.5 (a) Explain receiving end and sending end power circle diagram for a short transmission line. **07**

(b) Define the following terms: **07**

(i) Fusing current

(ii) Cut off current

(iii) Operating time of CB

(iv) Breaking capacity of CB
