

GUJARAT TECHNOLOGICAL UNIVERSITY**B E Sem-VI Examination May 2011****Subject code: 160803****Subject Name: Switchgear and Protection****Date: 19/05/2011****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.
4. Draw neat and labeled diagram wherever necessary

- Q.1** (a) Explain following theories of arc interruption: **07**
 i) Cassie's theory
 ii) Slepian's theory
 (b) In a short circuit test on a circuit breaker, the following data was obtained on **07**
 a frequency transient.
 i) Time to reach the peak of restriking voltage 55µsec.
 ii) The peak restriking voltage 100 Kv
 Determine the (a) natural frequency of the circuit
 (b) Avg. rate of rise of restriking voltage

- Q.2** (a) Explain minimum oil circuit breaker, with its advantages and disadvantages **07**
 (b) Explain arc quenching properties of SF₆ gas suitable in SF₆ circuit breakers. **07**

OR

- (b) Explain Air blast circuit breaker **07**

- Q.3** (a) Explain electromagnetic induction relays with necessary mathematical **07**
 equations.
 (b) An IDMT type over current relay is used to protect a feeder through 500/1 A **07**
 CT. The relay has a PS of 125% and TMS=0.3. Find the time of operation of
 the said relay if a fault current of 5000A flows through the feeder. Make use
 of the data:

PSM	2	3	5	8	10	15
Time(sec)	10	6	4.5	3.2	3	2.5

OR

- Q.3** (a) Write a short note on Directional relay **07**
 (b) Explain impedance relay with its mathematical equation and operating **07**
 characteristics.

- Q.4** (a) Explain differential protection and biased differential protection. **07**
 (b) Draw the block diagram of static relay and explain advantages and **07**
 disadvantages of static relays.

OR

- Q.4** (a) Write short note on instrument transformers. **07**
 (b) Explain any 1 scheme for protection of transformers. **07**

- Q.5** (a) Explain Translay relay with necessary diagram. **07**
 (b) Explain types of busbar protection schemes. **07**

OR

- Q.5** (a) Explain methods of neutral grounding **07**
 (b) Explain protection against lightening over voltages. **07**