

**B.Tech. IN ELECTRICAL ENGINEERING****Term-End Examination****December, 2013****BIEE-023 : SWITCHGEAR AND PROTECTION***Time : 3 hours**Maximum Marks : 70**Note : Answer any five questions in all.**All question carry equal marks.*

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1. (a) Discuss the principle of arc extinction in an oil circuit breaker with reference to restriking and recovery voltage. 10
  - (b) Compare MCCB and fuse on the basis of 4
    - (i) Size
    - (ii) Cost
    - (iii) Reliability
    - (iv) Safety
  2. (a) Explain the phenomenon of arcing ground. 4
  - (b) Suggest some methods to minimize the effect of arcing ground with neat sketch. 10
  3. (a) Define : Protective relay, relay time, pickup current and reset current. 6
  - (b) Draw the block diagram of static over current relay and explain its working. 8
  4. Explain with neat circuit diagram the pilot wire protection used for transmission line. 14

5. Classify the types of over current relay and give their applications along with their approximate characteristics. **14**
6. (a) In a short circuit test on a circuit breaker, the following readings were obtained on single frequency transient : **10**
- (i) Time to reach the peak restriking voltage, 50  $\mu$ s.
  - (ii) The peak restriking voltage, 100 kV. Determine the average RRRV and frequency of oscillation.
- (b) State the difference between Isolator and circuit breaker (any four points). **4**
7. (a) Explain in brief the biased differential protection used for protection of transformers with neat circuit diagram. **10**
- (b) What are the harmful effects of lightning ? **4**
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