

**B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTCLVI)****Term-End Examination****December, 2015****BIEE-023 : SWITCHGEAR AND PROTECTION***Time : 3 hours**Maximum Marks : 70*

Note : Attempt any seven questions. Each question carries equal marks. Use of scientific calculator is allowed.

1. Describe the construction, principle of operation and application of SF₆ circuit breaker. 10

2. In a short circuit test on a 3-pole, 132 kV CB, the following observations are made :
 p.f. of fault 0.4, the recovery voltage 0.9 times full line value, symmetrical breaking current, the frequency of oscillations of restriking voltage 16 kHz.

 Assuming that neutral is grounded, determine the average rate of rise of restriking voltage (RRRV). 10

3. What is a travelling wave ? Explain the development of travelling wave and its propagation on overhead transmission lines. 10

4. Explain the causes and effects of lightning on overhead transmission lines. 10
 5. What is meant by directional feature of a directional overcurrent relay ? Describe the construction and operation of a directional overcurrent relay. 10
 6. Name different types of static relays. Discuss the use of transistors as static relays. 10
 7. Describe the principle of Merz price protection applied to a power transformer. 10
 8. Explain the method of protecting bus bars by differential relaying. What are the limitations of this system ? 10
 9. Write short notes on any **two** of the following : 2×5=10
 - (a) Circuit Breaker Ratings
 - (b) Neutral Earthing
 - (c) Numerical Relays
 - (d) IEC Specifications of Switchgear
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