

Code No: **R41023****R10****Set No. 1****IV B.Tech I Semester Supplementary Examinations, February - 2019****SWITCH GEAR AND PROTECTION****(Electrical and Electronics Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Explain the different types of Circuit breakers and give the features of each one type in brief. [8]  
b) In a short circuit test, with earth neutral, on a 132 KV 3 – phase circuit breaker, the power factor of the fault was 0.3, the recovery voltage is 0.95 of full line value, the breaking current was symmetrical and the restriking transient has a natural frequency of 16,000 Hz. Estimate the rate of the Restriking voltage. Assume that the fault is grounded. [7]
- 2 a) List the advantages of Air Blast circuit breakers over an Oil circuit breakers. [7]  
b) Explain the working of a Vacuum breaker with a simple schematic and list the major obstacles in the way for vacuum Switches. [8]
- 3 a) Explain the construction and operating principle of Electromagnetic relays in detail. [7]  
b) Explain the principle of Distance relays stating clearly the difference between impedance relay, reactance relay and mho relay. Indicate the difference on R – X diagrams and show where each type is suitable. [8]
- 4 a) List and explain the different faults/abnormal operations in alternator Stator when subjected to a fault. [7]  
b) A 11 KV, three phase turbo alternator has a maximum rating of 120 MW at 0.85 power factor and its reactance is 0.1 p.u. It is equipped with differential current protection scheme. It is set to operate at fault currents not less than 550 amps. Determine the magnitude of the neutral earthing resistance that leaves the 10 % of the winding unprotected. [8]
- 5 With a neat Sketch and required operation explain for circulation current differential protection applied to star – star transformer. [15]
- 6 a) Explain with a neat sketch the operation of Differential relay protection for 3 – phase feeders. [8]  
b) Explain the procedure to achieve the frame leakage protection of bus bars. [7]
- 7 a) Distinguish between Static relays and Electromagnetic relays and list the applications of Static relays. [7]  
b) Explain the working of Static Directional distance relay with a neat block diagram. [8]
- 8 a) Explain the different methods of Neutral grounding in detail. [7]  
b) What are the requisites of a Good Lightning arrester? And explain any one type of it in detail. [8]