Code No: **R1641024** **R16** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Jan/Feb - 2022

SWITCHGEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
****

PART–A *(14 Marks)*

1. a) List the main features of Air circuit breakers and Moulded case circuit breakers. [3]
   b) Explain where and why you would prefer directional current relay. [2]
   c) Discuss the protection of an alternator running in parallel with others against reverse power. [3]
   d) Explain the need for circulating current differential protection scheme for a single bus bar. [2]
   e) List the advantages of Static relays [2]
   f) Explain how the wave form of a surge is specified. [2]

PART–B *(4x14 = 56 Marks)*

2. a) Explain the term rate of rise of re – striking voltage. Dxplain the factors on which it depends. [7]
   b) Explain the working of a Sulphur hexafluoride (SF_6) circuit breaker with a neat constructional layout. [7]

3. a) Explain the construction and operating principle of Electromagnetic relays. [7]
   b) Explain the principle of distance relays stating clearly the difference between impedance relay, reactance relay and mho relay. [7]

4. a) Explain the necessary measures to protect the transformer from excessive damage due to faults and also suggest the relays required. [7]
   b) A 6000 KVA, 6600 V star connected alternator has a synchronous reactance of 3 ohms per phase and 1 ohm resistance. It is protected by a Mertz Price balanced current system which operates when the out of balance current exceeds 30% of the load current. Determine what proportion of the alternator winding is unprotected if the star point is earthed through a resistor of 6 ohms [7]

5. a) Explain with a neat sketch about the differential relay protection for three phase feeders. [7]
   b) Explain how the carrier current protection scheme is used for Feeder protection. [7]

6. a) List and explain the various electronic circuits commonly used in static relays. [7]
   b) Explain the operation of Static over current relay with a neat block diagram. [7]

7. a) Explain how a piece of cable between an overhead line and the sub – station is effective in reducing the amplitude of the surge arrester and the flattening of the wavefront. [7]
   b) Explain the various methods of reducing the Switching over voltages. [7]