

6th Sem. /ELECT./EEE/ ELECT(I & C)/EME / 2022(S)
TH-2 Switchgear and Protective Devices

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. Define(i) TSM(ii) Symmetrical fault
 - b. State any two important faults that occur on an alternator.
 - c. What is the use of distance relay?
 - d. What are the factors on which RRRV (rate of rise of restriking voltage) in circuit breaker depends?
 - e. What are the desirable characteristics of fuse element?
 - f. State any two advantages of static relay.
 - g. A fuse wire of circular cross-section has a radius of 0.8 mm. The wire blows off at a current of 8A. Calculate the radius of the wire that will blow off at a current of 1A.
 - h. What is the function of surge absorber?
 - i. Define(i) Short circuit kVA (ii) Recovery voltage
 - j. Write any two advantages of valve type lightning arrester.

2. Answer **Any Six** Questions 6 x 5
 - a. What steps to be taken for the maintenance of oil circuit breakers?
 - b. Write a short note on High voltage fuses.
 - c. A 3-phase, 20 MVA, 10 kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short-circuit does not exceed 8 times the full load current.
 - d. Explain the protection of switchgear against lightning using overhead ground wires briefly.
 - e. Write a brief note on plain break oil circuit breaker with a neat diagram.

- f. How time-graded protection of a radial feeder can be achieved using definite time relays and inverse time relays?
- g Describe about the Earth fault or Leakage protection of 3 phase transformer.
- 3 Explain about the construction and operation of Buchholz relay in transformer with neat diagram. 10
- 4 With the help of neat diagram, describe the construction, working of Vacuum circuit breakers and also write its advantages. 10
- 5 Write a brief note on i) Horn-gap arrester ii) Percentage differential relay. 10
- 6 Explain about the construction and operation of Induction type Directional power relay with a neat diagram 10
- 7 Describe the differential protection of Alternators using Merz-Price circulating scheme in details. 10