



**B.TECH.**  
**(SEM VI) THEORY EXAMINATION 2017-18**  
**SWITCHGEAR AND PROTECTION**

**Time: 3 Hours****Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- Explain what you understand by pick-up value of actuating quantity.
  - Discuss what you understand by stability of a protective relay.
  - Explain time setting of over-current relay.
  - Compare the time-current characteristics of very inverse relay with that of IDMT relay.
  - Explain briefly reactance relay characteristic on the R-X diagram.
  - What do you understand by the term 'under-reach'?
  - What type of protective device is used for the protection of an alternator against overheating of its rotor?
  - What is magnetizing inrush current?
  - Discuss the energy balance theory of arc interruption in circuit breaker.
  - Define breaking capacity of a circuit breaker.

**SECTION B**

- 2. Attempt any three of the following: 10 x 3 = 30**
- Discuss the working principle, types and applications of thermal relays.
  - Explain stepped time-distance characteristics of three impedance relaying units used for I, II and III zone of protection.
  - What is carrier current protection? What are its merits and demerits?
  - Discuss the protection employed for the field winding of the alternator against ground faults.
  - Discuss the operating principle of vacuum circuit breaker. What are its advantages over other circuit breakers?

**SECTION C**

- 3. Attempt any one part of the following: 10 x 1 = 10**
- What are the various types of over-current relays? Discuss their area of applications.
  - Explain what you understand by primary and back-up protection. What are the various methods of providing back-up protection?
- 4. Attempt any one part of the following: 10 x 1 = 10**
- What are the different types of attracted armature type relays? Explain why they are noisy.
  - What are the different types of amplitude comparators? Discuss the operating principle of rectifier bridge amplitude comparator.
- 5. Attempt any one part of the following: 10 x 1 = 10**
- Draw and explain the characteristic of MHO relay on R-X diagram. Discuss the effect of power surge on its performance.





- b. What is unit protection? Discuss the phase comparison scheme of carrier current protection.

**6. Attempt any *one* part of the following: 10 x 1 = 10**

- a. What are the different methods of testing of circuit breakers? Discuss their merits and demerits.
- b. Explain the terms: re-striking voltage, recovery voltage and RRRV. Derive expression for re-striking voltage and RRRV in terms of system voltage, inductance and capacitance.

**7. Attempt any *one* part of the following: 10 x 1 = 10**

- a. Discuss the protection employed against loss of excitation of the alternator.
- b. With a neat sketch, discuss the differential scheme for bus-zone protection.

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