

**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**

- a. Explain what you understand by pick-up value of actuating quantity.
- b. Discuss what you understand by stability of a protective relay.
- c. Explain time setting of over-current relay.
- d. Compare the time-current characteristics of very inverse relay with that of IDMT relay.
- e. Explain briefly reactance relay characteristic on the R-X diagram.
- f. What do you understand by the term 'under-reach'?
- g. What type of protective device is used for the protection of an alternator against overheating of its rotor?
- h. What is magnetizing inrush current?
- i. Discuss the energy balance theory of arc interruption in circuit breaker.
- j. Define breaking capacity of a circuit breaker.

**SECTION B**

**2. Attempt any three of the following: 10 x 3 = 30**

- a. Discuss the working principle, types and applications of thermal relays.
- b. Explain stepped time-distance characteristics of three impedance relaying units used for I, II and III zone of protection.
- c. What is carrier current protection? What are its merits and demerits?
- d. Discuss the protection employed for the field winding of the alternator against ground faults.
- e. 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**

- a. What are the various types of over-current relays? Discuss their area of applications.
- b. 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**

- a. What are the different types of attracted armature type relays? Explain why they are noisy.
- b. 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**

- a. 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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