

Paper Id:

120730

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B.TECH
(SEM VII) THEORY EXAMINATION 2019-20
POWER SYSTEM PROTECTION

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 7 = 14**

- a. Draw the circuit diagram of basic protection scheme.
- b. Explain the operating principle of differential relay.
- c. Define RRRV.
- d. What do you understand by the term “Current Chopping”?
- e. Give the classification of circuit breakers based on medium used for arc quenching.
- f. Explain the terms Primary and Backup protection.
- g. What do you understand by pilot wire protection scheme?

SECTION B**2. Attempt any three of the following: 7 x 3 = 21**

- a. Explain the operating principle of Induction type relay. Derive the expression for the force exerted on the plates of Induction type relay.
- b. Explain the operation of Impedance Relay along with its characteristics.
- c. What do you understand by Carrier Current Protection scheme? Explain Phase Comparison Carrier Current Protection in detail.
- d. What are the different methods of testing circuit breakers? Discuss their merits and demerits. Which method is more suitable for testing the circuit breakers of large capacity?
- e. Describe the construction, operating principle and application of vacuum circuit breaker. What are its advantages over other circuit breakers?

SECTION C**3. Attempt any one part of the following: 7 x 1 = 7**

- (a) What do you understand by zone of protection? Discuss various zones of protection with the help of single-line diagram.
- (b) Explain how gas actuated relay operates. Also write down its applications.

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

- (a) Give a detailed comparison between static and electromagnetic relay.
- (b) Describe in detail the operation of directional earth fault relay along with their applications.

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

- (a) Explain Circulating Current scheme used in wire pilot protection.
- (b) What is a carrier blocking scheme? Discuss its merits and demerits over other types of carrier aided distance protection.

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

- (a) For a 132 kV system, the reactance and capacitance up to the location of the circuit breaker is 3Ω and $0.015 \mu\text{F}$, respectively. Calculate:
- i. Frequency of transient oscillations.
 - ii. Maximum value of restriking voltage across the contacts of circuit breaker.
 - iii. Maximum value of RRRV.
- (b) Discuss how making capacity and breaking capacity of a circuit breaker are tested in a laboratory type testing station.

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

- (a) Discuss the properties of SF_6 which makes it most suitable for circuit breakers.
- (b) Discuss the selection of circuit breakers for different ranges of the system voltages.