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**BTECH**  
**(SEM VII) THEORY EXAMINATION 2023-24**  
**POWER SYSTEM PROTECTION**

**TIME: 3 HRS****M.MARKS: 100****Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.**

Qno.	Question	Marks	CO
a.	Describe why overlapping of protective zone is required.	2	1
b.	Explain sensitivity and selectivity of relays.	2	1
c.	List out the types of over current relay and draw its characteristics.	2	2
d.	What disadvantage is faced by electromagnetic attraction type relays in AC.	2	2
e.	Mention the types of over current relays and draw its time current characteristics.	2	3
f.	Explain the working principle of differential protection scheme.	2	3
g.	Explain the arcing phenomenon in circuit breaker.	2	4
h.	Which circuit breaker is best suited for the voltages above 400KV.	2	4
i.	Describe logic train circuits.	2	5
j.	Explain the term security in regard to power system protection.	2	5

**SECTION B****2. Attempt any three of the following:**

a.	Explain the operation of summation transformer. How specification of summation transformers are described.	10	1
b.	Explain amplitude and phase comparators. At what condition amplitude comparator can be used as phase comparator.	10	2
c.	Explain merz price protection scheme of transformers with a well-defined diagram. Why CTs are connected in delta /star for a star/delta connected winding.	10	3
d.	Explain the operation of bulk oil circuit breaker. Mention its disadvantages and advantages.	10	4
e.	Draw a major functional block diagram of microprocessor-based relay. Mention the benefits and short comings of microprocessor-based relays.	10	5

**SECTION C****3. Attempt any one part of the following:**

a.	Describe zones of protection and mention its important features. Draw a suitable diagram and explain the need of overlapping zone in power system protection.	10	1
b.	Describe relay back up and breaker up protection in power system network.	10	1

**4. Attempt any one part of the following:**

a.	Describe the operation of directional relays in parallel feeders. Why non directional relays are preferred at generator side.	10	2
b.	What is incipient fault? Explain the working of Bucholz relay.	10	2

**5. Attempt any one part of the following:**

a.	Explain time/current graded protection scheme of transmission lines.	10	3
b.	Explain carrier current graded protection of transmission lines. Mention the type of pilot wires used to convey the information.	10	3

**6. Attempt any one part of the following:**

a.	Explain the working of air blast circuit breaker. Mention its advantages, disadvantages and applications	10	4
b.	Explain the working of vacuum circuit breaker. Mention its advantages, disadvantages and applications	10	4

**7. Attempt any one part of the following:**

a.	Draw and explain the block diagram of static relays and mention the role of each component in detail.	10	5
b.	Describe the role of SCADA system for the reliable working of power protection system.	10	5