Sixth Semester B.E. Degree Examination, July/August 2021
Switch Gear and Protection

Time: 3 hrs.   Max. Marks:100

Note: 1. Answer any FIVE full questions.
2. Assume missing data, if any.

1   a. Define switch gear. Distinguish between isolating and load braking switch.   **(06 Marks)**
    b. Define: (i) Fuse (ii) Rated current of fuse (iii) Fusing current (iv) Fusing factor
                                                                                          (08 Marks)
    c. Write a short note on HRC fuse with a neat diagram.   **(06 Marks)**

2   a. Derive an expression for Rate of Rise of Restriking Voltage (RRRV) and maximum RRRV.
                                                                                          (08 Marks)
    b. With a neat diagram and necessary waveforms, explain the phenomenon of inductive current
       chopping.   **(06 Marks)**
    c. In a short circuit test on circuit Breaker time to reach peak restriking voltage is 55 μs, peak
       restriking voltage is 100 KV, determine :
       (i) Natural frequency of circuit   (ii) Average RRRV   **(06 Marks)**

3   a. With a neat sketch, explain the construction and working principle of vacuum circuit
       breaker.   **(10 Marks)**
    b. With a neat sketch, explain the working principle of single pressure SF6 circuit breaker.
                                                                                          (10 Marks)

4   a. Explain the working principle, merits and demerits of horn-gap arrestor.   **(10 Marks)**
    b. What is synthetic testing of a circuit breaker? With a neat circuit explain two types of
       synthetic testing.   **(10 Marks)**

5   a. With a neat diagram, explain zones of protection in a power system.   **(08 Marks)**
    b. Explain the classification of protective relay.   **(06 Marks)**
    c. Define the following terminologies:
       (i) Operating force   (ii) Pick up level   (iii) Reset level   **(06 Marks)**

6   a. Explain the principle of three stepped distance protection of transmission line.   **(10 Marks)**
    b. Explain with a neat sketch negative sequence relay and its application.   **(10 Marks)**

7   a. Explain clearly the differential protection scheme for bus bar protection and mention its
       drawbacks.   **(10 Marks)**
    b. A star connected 3-phase, 12 MVA, 11 KV alternator has a phase reactance of 10%. It is
       protected by Merz-Price circulating, current scheme which is set to operate for fault current
       not less than 200 A. Calculate the value of earthing resistance to be provided in order to
       ensure that only 15% of alternator winding remains unprotected.   **(10 Marks)**

8   a. With a neat sketch, explain single phasing preventer used for induction motor.   **(10 Marks)**
    b. Explain with a neat sketch, Merz-Price protection scheme for star-delta transformer.
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