6E6073

Roll No. _____ [Total No. of Pages : 3

6E6073

B.Tech. VI Semester (Main/Back) Examination, April/May - 2017

Elect. Engg

6EX3A Switchgear & Protection

EE,EX

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Classify relay according to their construction, application and principle of operation and time of operation. **(10)**

b) Write a short note on "Phase splitting type amplitude comparator". **(6)**

(OR)

1. a) Explain the Hall effect devices. How can they be used as phase comparator? **(8)**

b) Name of the coincidence circuit type phase comparator. Explain direct phase comparison techniques. **(8)**

Unit-II

2. a) A 3–ϕ, 15 MVA, 11KV star connected generator is protected by the current balancing system of protection. If the ratio of CT is 1200/5, the minimum operating current of the relay is 0.7A and the neutral point earthing resistance is 5.5Ω. Calculate the percentage of each phase of state winding which is unprotected against earth faults when the machine is operating at normal voltage. **(8)**

b) Discuss all the factors on which protective gear for transformer depends and also discuss differential protection for it. **(8)**

(OR)

2. a) Derive torque equation for reactance relay with construction diagram and operating characteristic. **(8)**

b) Write a short note on choice between impedance, reactance and MHO relay. **(8)**

Unit-III

3. a) Discuss about carrier assisted and carrier block scheme of distance protection. **(10)**

b) Write a short note on power swings. **(6)**

(OR)

3. a) What do you understand by out of step blocking? Discuss the operating principle of an out of step bloching relay. **(8)**

b) Draw and explain the circuit connection of three MHO units used at a particular location for three zones of protection. **(8)**

Unit-IV

4. a) Explain Arc interruption theories. **(8)**

b) In a short circuit test on a circuit breaker, the following data was obtained on a frequency transient. **(8)**

i) Time to reach the peak restriking voltage, 55 μs .

ii) The peak restriking voltage, 100 KV. Calculate the

a) Natural frequency of the circuit

b) Average rate of rise of restriking voltage

(OR)

4. a) Discuss Air circuit breaker construction and working principle. **(8)**

b) Derive the expression for resistance to be connected across the breaker contacts and calculate the same for given data. L = 4.5H, C = 0.02 μf. **(8)**

Unit-V

5. a) Write a short note on air blast circuit breaker. **(8)**

   b) Write a short note on construction and advantage of vacuum circuit breaker. **(8)**

(OR)

5. a) Write a note on selection of circuit breaker and discuss the advantages of SF_6 circuit breaker. **(10)**

   b) Write a short note on rating of circuit breaker. **(6)**