

8E 8043

Roll No. 15EE08058

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B.Tech.VIII Semester (Main&Back) Examination, April - 2019
Electrical And Electronics Engineering
8EX3A Protection of Power System
Common with 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 suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Use the following supporting material is permitted during examination.

1. Scientific Calculator.

Unit - I

1. a) Justify why overlapping zone of protection are required for protection purpose. Explain importance of primary and backup protection. (8)
b) Describe the transient errors in the CT and CVT by drawing the transient response and giving the suitable mathematical treatment. (8)

(OR)

1. a) Justify qualities and functional characteristics required by a relay with respect to protection. (8)
b) Define the following terms concerning to a relay: (2+2+2+2=8)
 - i) Discrimination.
 - ii) Reliability of the relay.
 - iii) Selectivity.
 - iv) Sensitivity.

Unit - II

2. a) Describe the construction, principle of operation of a directional over current relay. And how the 30°, 60° and 90° connections of directional over current relay are obtained. (6)

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(1)

[Contd....

- b) Distinguish over current relay on the basis of definite time, inverse definite minimum time (IDMT) characteristics. (6)
- c) Describe Time setting, Plug setting and Current setting of over current relay. (4)

(OR)

2. a) Describe the construction and principle of operation of Disc type induction over current relay. Derive torque equation. (6)
- b) The current rating of a relay is 3A. PSM is 1.0; CT ratio is 300/3, fault current is 3000A. Find the operating time of the relay for a TMS = 0.3. At TMS = 1, the operating times at various PSM are : (6)

PSM	2	4	6	7	8	10
Operating Time(S)	8	6	5	3	2.8	2.4

- c) Discuss the protection scheme for feeders. (4)

Unit - III

3. a) What are the consequences of failure of prime mover of an alternator? How the protection against such fault is implemented. (8)
- b) Explain the protection of alternator against overheating of stator. (8)

(OR)

3. a) Explain with neat diagram of connections, the principle of operations of current balance type differential protection of generator against earth and inter phase fault. (8)
- b) Describe the rotor earth-fault protection and loss of excitation protection schemes for generator. (8)

Unit - IV

4. a) Draw and explain the construction and working of Buchholz's relay. Against which fault Buchholz's relay gives the protection? State its advantages and Disadvantages. (10)
- b) What is over fluxing in transformer? When it occurs? What are the different methods to overcome this? (6)

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(2)

(OR)

4. a) What is magnetizing inrush current? What measures are taken to distinguish between the fault current and magnetizing inrush current? Discuss the protective scheme which protects the transformer against faults but does not operate in case of magnetizing inrush current. (10)
- b) Explain high impedance relay scheme for bus-bar protection. (6)

Unit - V

5. a) What are the possible causes of earth faults in an induction motor? Explain the application of earth fault relay for the protection of induction motor. (8)
- b) Explain the importance and basic principle of distance protection of a transmission line. (8)

(OR)

5. a) Describe and compare characteristics of impedance, reactance and mho relay with respect to arc resistance and power swings. (8)
- b) Give the Scheme of distance protection of a three phase line. (8)