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8E8043

Roll No. _____

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B.Tech. VIII Semester (Main) Examination, April 2016

Electrical and Electronics Engineering

8EX3A Protection of Power System

Common with 8EE3A

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

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

Unit - I

1. a) What are the different types of faults? Which type of fault is most dangerous. And explain essential qualities of a protective relay. And also explain the basic operation of trip circuit with suitable circuit diagram (10)
- b) Explain what you understand by primary and back-up protection. What are the various methods of providing back-up protection (6)

OR

1. a) Draw the magnetization characteristics of protective and measurement CTs. And give the comparison between measuring CTs and protective CTs. (8)
- b) Derive phase angle and ratio error for PT? (8)

Unit - II

2. a) Classify and explain different types of over current relays. And also draw characteristics of various overcurrent relays (8)
- b) The current rating of an over current relay is 5A. The relay has a plug-setting of 150% and Time Multiplier Setting(TMS) of 0.4. The CT ratio is 400/5. Determine the operating time of the relay for a fault current of 6000A. At TMS=1 operating time at various PSM are given in the table-I

Table-I

PSM	2	4	5	8	10	20	
Operating time							
in seconds	10	5	4	3	2.8	2.4	(8)

OR

2. a) Discuss the protective scheme for a feeders (8)
- b) Describe the construction principle of operation of a directional over current relay. And how the 30° , 60° , 90° connections of directional over current relay are obtained (8)

Unit - III

3. a) Describe the construction and operating principle of the percentage differential relay. How the percentage differential relay overcomes the drawbacks of the simple differential relay (10)
- b) Explain different types of faults occur in generator (6)

OR

3. a) Describe the negative sequence protection schemes for generator (8)
- b) Explain stator inter-turn fault protection for multi turn generator with suitable circuit diagram (8)

Unit - IV

4. 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 doesnot operate in case of magnetizing inrush current (16)

OR

4. a) Explain the construction and working of Buchholz relay. Against which faults Buchholz relay gives the protection (8)
- b) What is frame leakage protection of busbar? Discuss its principle and field of application. (8)

Unit - V

5. What is universal Torque equation? Using this equation derive and draw following characteristics
 - i) Impedance relay

ii) Reactance relay

iii) Mho relay

And also discuss the application of the impedance relay, reactance relay and Mho relay. (16)

OR

5. a) Explain the three stepped distance protection of transmission line (8)

b) Describe the protection provided to Induction motors for earth faults (8)