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B.E./B.Tech(Full Time) DEGREE END SEMESTER EXAMINATIONS APRIL/ MAY. 2011
COLLEGE OF ENGINEERING GUINDY CAMPUS,ANNA UNIVERISTY,CHENNAI
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH

Fifth Semester

EE 9306 Protection and Switchgear

(Regulations 2008)

Time: 3 Hours **Max. Marks: 100**

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. What is the need for different protective zones?
2. Draw the characteristics of an impedance and mho relay on an R-X diagram
3. Differentiate system earthing and equipment earthing.
4. Draw the block diagram for a static directional over current relay.
5. What is the significance of current limiting reactors?
6. What are the limitations in bus bar protection?
7. Define the terms "Symmetrical Breaking Current and Making Capacity" related to circuit breakers?
8. What is the significance of resistance switching in circuit breakers?
9. What are problems encountered during inductive current breakings?
10. What are the different tests carried out on circuit breakers?

PART – B (5 x 16 = 80 Marks)

11. Obtain an expression for rate of rise of transient recovery voltage and explain in detail the various factors affecting the same.

12. a. What are the different types of faults in power system. Explain the fault current calculations for a Double line- Ground fault by symmetrical component method and hence derive the fault current and phase voltages.

(OR)

12. b With neat diagrams explain in detail the different types of distance relays and hence derive the necessary equations

13. a Explain the different types of faults and the protective schemes used against each type in a Transformer.

(OR)

13.b.(i) A star connected, 3-phase, 10MVA, 6.6kV alternator has a per phase reactance of 10 %. Its is protected by Merz- Price circulating-current principle which is set to operate for fault current not less than 175 A. Calculate the value of earthing resistance to be provided in order to ensure that only 10% of the alternator winding remains unprotected **(10)**

(ii) Explain the distance protective scheme for feeders. **(6)**

14.a. A 50 Hz, 11 kV, 3-phase alternator with earthed neutral has a reactance of 5 ohms per phase and is connected to a bus-bar through a circuit breaker. The distributed capacitance upto circuit breaker between phase and neutral in 0.01μF. Determine

(i) peak re-striking voltage across the contacts of the breaker

(ii) frequency of oscillations.

(iii) the average rate of rise of re-string voltage upto the first-peak **(10)**

(ii) Explain the problems encountered in interrupting capacitive currents. **(6)**

(OR)

14 b Explain with relevant theories the arc formation and arc interruption in a Circuit breaker?

15.a. (i) Explain with neat diagrams the principle of operation of vacuum circuit breakers.

(ii) Compare the different types of circuit breakers **(8+ 8)**

(OR)

15.b. Explain with neat diagrams the principle of operation and different types of oil Circuit breakers

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