Exam.Code:0935
Sub. Code: 33761

2124

B.E. (Electrical and Electronics Engineering)
Fifth Semester
PC-EE-501: Power System - II

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

1. (a) How biasing affects the performance of differential protection relay?
   (b) What is the role of steel wires in power system protection? What is the location of these?
   (c) Draw a figure for arc extinguish phenomena in AC circuit breaker clearly indicating Arc voltage, TRV and Recovery voltage.
   (d) Why over current relays are not preferred for long transmission lines protection?
   (e) What are properties of SF_6 , which makes it more suitable medium for arc quenching?

(5*2=10)

PART-A

2. (a) Define transient recovery voltage, Arc voltage and rate of rise of restriking voltage. Drive an expressioncorrelating these?
   (b) The rating of an oil circuit breaker is 3000 A, 4500 MVA, 66 kV, 5 sec, three phase. Determine the rated breaking current, rated making current and short time rating.

(5,5)

3. (a) Discuss three stepped characteristics of distance relay.
   (b) Discuss Arc extinction phenomena in capacitive loads with the help of a diagram.
   (c) For a 10 MVA, 132 KV/6.6 KV power transformer with delta/ star connection. Obtain the number of turns each current transformer should have for differential protection scheme to circulate a current of 5 A in the pilot wires.

(4,3,3)

4. (a) Determine the time of operation of the relays placed at different locations No 1 and 2 assumingthat fault current is 2000 A near to relay 1, CT ratio 200/1 , relay 1 is set at 100% and relay 2 is set at 125%. The relay number 1 has a time multiplier of 0.2. The time grading margin between the relays is 0.5 second for discrimination. Assume that the relay to have 2.2 sec IDMT characteristics.
   (b) What is current chopping phenomena in airblast circuit breaker? How it impacts the arc extension phenomena? How it is corrected?

(5,5)

PART-B

5. (a) What are direct and indirect lightning stroke how power system is protected against these?
   (b) A 220 kV, 3 phase, 50 Hertz, 60 km long overhead transmission line has capacitance of 1.2 μFper kilometre. Determine the inductive and KVA rating of the arc suppression coil suitable for this system to eliminate arcing ground effect.

(5,5)

P.T.O.

6. (a) What is the need of neutral grounding in power system performance? Discuss with the help of phasor diagrams.

   (b) Define touch potential, step potential and transferred potential. Derive an expression for ground resistance for a rod type electrode.

(5,5)

7. (a) What are the causes of over voltages in power system? What are the different protective devices used for these?

   (b) How insulation coordination is done for generator, bus bar and power transformer in a substation. Explain with the help of a diagram.

(5,5)

x-x-x