

2063  
B.E. (Electrical and Electronics Engineering)  
Fifth Semester  
PC-EE-501: Power System - II

Time allowed: 3 Hours

Max. Marks: 50

*NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Assume any missing data.*

x-x-x

1. (a) How PSM and TSM of an over current relay affect its performance?  
(b) Write advantages of pilot relays over distance relays.  
(c) Define making and breaking capacity of circuit breakers.  
(d) Discuss in short, the protection device used for direct strokes.  
(e) What is bias coil in differential relay?

(5 \* 2)

**PART-A**

2. (a) Generators A and B are identical and are rated 13.8 kV, 21 MVA and have a transient reactance of 30% at their own MVA base. The tie-line is 50 miles long having reactance of  $0.848\Omega/\text{mile}$ . The three phase fault is assumed at 20 miles from station A. Find short circuit MVA.  
  
(b) Discuss protection of feeder fed from two sources of supply with the help of an example.
3. (a) A 50 MVA, 132kV/33 kV star elta transformer is earthed solidly on star side, the delta side is earthed by means of an interconnected earthing transformer and a neutral grounding resistor. Show how Merz-Price protection may be applied to such a situation assuming 1 A secondary CT ratings? Suggest suitable CT ratio.  
  
(b) Discuss construction and working of directional unit.

(5,5)

(5, 5)

P.T.O.



(2)

4. (a) What is over reach and under reach of a relay? Discuss factors that cause these and how these can be avoided?

(b) A 20 MVA transformer which may be called upon to operate at 30% overloads, feeds 11 kV bus bar through a CB. Transformer CB is equipped with 1000/5A CTs and the feeder circuit breaks with 400/5A CTs and all sets of CTs feed induction type over current relays. The relays on feeder CB have plug setting of 125% and 0.3 time setting. If a 3- $\phi$  fault of current 5000A flows through transformer to one of the feeders, find operating time of feeder relay, minimum plug setting of transformer relay and its time setting assuming discrimination time margin of 0.5 sec.

(5, 5)

### PART-B

5. (a) Explain methods of arc extinction in circuit breakers.

(b) A 50 Hz, 11 kV, 3- $\phi$  alternator with earthed neutral has a reactance of  $5\Omega$ / phase and is connected to a bus-bar through a circuit breaker. The distributed capacitance upto circuit breaker between phase and neutral is  $0.01\mu\text{f}$ . Find peak to peak voltage across breaker contacts, frequency of oscillations, average RRRV upto first peak.

(5, 5)

6. (a) Discuss different internal and external causes of over voltages in power systems.

(b) Explain different types of lightening arrestors. How these are selected for different applications?

(5, 5)

7. (a) What is the use of neutral grounding in power systems? Explain different types of it.

(b) Write significance of BIL and insulation coordination.

(7, 3)

x-x-x