

2122  
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. 1 which is compulsory and selecting two questions from each Part.

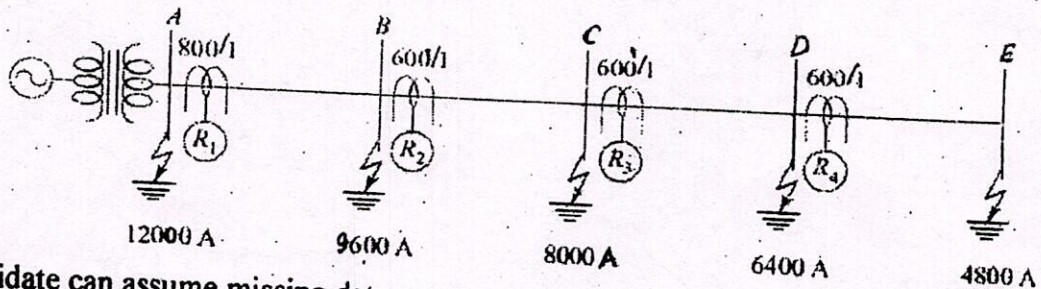
x-x-x

- What is the reason of overshoot of a relay in distance relay?
  - What are the causes of overvoltage in transmission lines?
  - Discuss characteristics of lightning arrester which makes it suitable for protection.
  - Discuss type of material used for fusing wire?
  - Draw TRV, RRRV and recovery voltage for a 3-phase SC fault on a synchronous machine.

(5\*2=10)

PART-A

- Discuss protection of feeder for single and double source fed supply with the help of an example.
  - Using standard IDMT relays, calculate the relay settings of the relays R1, R2 and R3 for the system shown in Fig 1. Plug setting and TMS of the relay R4 is 100% of CT secondary rating and 0.1, respectively.



Candidate can assume missing data.

- What is problem of power swing? How this problem is avoided in distance relays? (5,5)
  - A three phase 66/11 kV, power transformer is connected in star/delta. The transformer is protected by Merz-Price circulating current system. CT ratio on LV side is 200/5, find CT ratio on HV side. Draw schematic diagram for this. (5,5)
- Why generator winding is not protected fully for earth faults using differential relay? (5,5)

Contd.....P/2

(2)

- (b) What is directional relay? Discuss its working with the help of diagram.

(5,5)

## PART-B

5. (a) What are direct strokes of lightning? How is power system protected against this?  
 (b) What is arcing ground? How it is overcome?
- (5,5)
6. (a) Define TRV, RRRV and recovery voltage. Derive an expression correlating TRV, RRRV and recovery voltage.  
 (b) A circuit breaker is rated at 1800 A, 2000 MVA, 13.2kV, 10 sec, 3-phase. Find its making and breaking current.  
 (c) In a system, 132 kV the circuit phase to ground capacitance is 0.01 mF, the series inductance is 6 H. Calculate the voltage appearing across the pole of a circuit breakers if a current of 10 A (instantaneous) is interrupted. Calculate value of resistance to be used to eliminate restriking voltage transient.
- (4,3,3)
7. (a) What is step and touch potential? Derive an expression of ground resistance.  
 (b) A 132 kV, 3-phase, 150km long transmission line has a capacitance of  $0.015\mu\text{F}/\text{km}$  per phase. Determine inductive reactance and MVA rating of arc suppression coil suitable for line to eliminate arcing ground phenomena.

(5,5)