PART - A (25 Marks)

1. What is the need of power system protection? 2
2. Distinguish between primary and back up protection. 3
3. What are the advantages of static relays? 2
4. Plot the characteristics of impedance, reactance and MHO relays on R-X diagram. 3
5. Explain the principle of circulating current differential protection. 2
6. What are the faults that likely to occur in a transformer? 2
7. What is current chopping? 3
8. How arc is initiated in circuit breakers? 3
9. Mention the disadvantages of gas insulated substation. 3
10. What is a surge diverter? 2

PART - B (50 Marks)

11. a) What is amplitude comparator? How it can be converted into phase comparator? 5
   b) Explain the operation of microprocessor based over current relay using block diagram. 5

12. a) An over current relay of rating 5A and setting 150% is connected to the secondary of a
    C.T. of ratio 300/5. Calculate the current in the line for which the relay picks up. 5
    b) Derive the expression for torquer developed in induction type relay. 5

13. a) Explain the construction and operation of Buchholz relay. 5
    b) Explain the protection of generator against over heating. 5
14. a) What is resistance switching?

b) What are the advantages and disadvantages of SF$_6$ circuit breaker?

15. What are ground rods and counterpoise? Explain clearly how these can be used to improve the grounding condition. Give various arrangements of counterpoise.

16. a) Derive expression for maximum RRRV in circuit breakers.

b) Discuss the protective scheme for parallel feeders.

17. Write a short note on:

a) Expulsion type lightning arrester.

b) Peterson Coil.