A 1221

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Sixth Semester

Electrical and Electronics Engineering

EE 338 — PROTECTION AND SWITCHGEAR

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the protective zones of the power system?

2. What is meant by time settling multiplier in protective relaying?

3. What is role of comparator in long distance transmission line protection?

4. A 3 phase, 220 V/11,000 V transformer is connected in star-delta and the protective transformers on the 220 V side is having a current ratio of 600/5. What must be the ratio of CTs on the 11000 V side?

5. What is current chopping related to arc quenching?

6. Why dc circuit breaking is difficult compared with ac circuit breaking?

7. What are the advantages of airblast circuit breaker?

8. What are the major parts of vacuum circuit breaker?

9. What are the causes for transient overvoltages in transmission lines?

10. A 132 kV, 3 phase, 50 Hz overhead line, 50 km long has a capacitance to earth for each line of 0.0157 μF/km. Determine the inductance and kVA rating of the arc suppression coil.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the physical, chemical and dielectric properties of SF_6 gas? (3 + 3 + 3)

(ii) Explain single pressure puffer type SF_6 circuit breaker. (7)

Or

(b) Write a notes on the following :

(i) Buchholz relay

(ii) Translay protection to a 3 phase feeder.

12. (a) Draw the characteristics of the following distance relays on the R–X diagram and explain

(i) Mho relay

(ii) Reactance relay.

Or

(b) Explain the applications of microprocessors in power system protection. Explain microprocessor based inverse time over-current relay.

13. (a) (i) Explain with the help of line diagram the operation of percentage differential relaying.

(ii) Explain the generator-transformer unit protection using the above relaying scheme.

Or

(b) A 3 phase, 200 kVA, 11 kV/0.4 kV transformer is connected as delta/star. The protective transformers on the 0.4 kV side have turns ratio of 500/5. What will be the turns ratio on the HV side? Also obtain the circulating current when the fault of 750 A, of the following types occur on the low voltage side. Assume balance voltage.

(i) Earth fault within the protective zone

(ii) Earth fault outside the protective zone

(iii) Phase to phase fault within the protective zone

(iv) Phase to phase fault outside the protective zone.

14. (a) Explain rupturing capacity, making capacity, and short time rating and rated current of the circuit breaker. (7 + 3 + 3 + 3)

Or

(b) (i) Discuss on resistance switching. (6)

(ii) Explain the construction and working of double arc extinction chamber axial blast ABCB. (10)

15. (a) (i) Explain the advantages of neutral grounding. (6)

(ii) Explain the arc suppression by Peterson coil grounding technique. (10)

Or

(b) Explain in detail with suitable diagrams :

(i) Valve type lightning arrester

(ii) Surge absorber.