



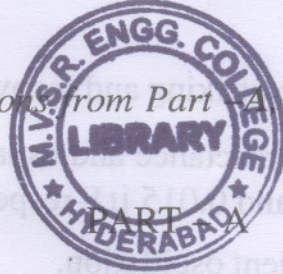
(50 Marks)

FACULTY OF ENGINEERING
B.E. 4/4 (E & EE) I Semester (Main) Examination, December 2010
SWITCHGEAR AND PROTECTION

Time : 3 Hours]

[Max. Marks : 75

Note : Answer all questions from Part-A answer any five questions from Part-B.



(25 Marks)

1. What is meant by plug setting multiplier of an over current relay ? How can you change this setting in an induction type over current relay. 3
2. What is universal relay torque equation ? 2
3. "Reactance relay is normally not preferred for protection of long transmission lines" – Justify the statement. 3
4. Mention four advantages of a static relay over an electro mechanical relay. 2
5. An 11 KV, 100 MVA alternator is provided with differential protection. The percentage of winding to be protected against phase to ground fault is 85%. The relay is set to operate when there is 20% out of balance current. Determine the value of the resistance to be placed in the neutral to ground connection. 3
6. A 132/33 KV Y/D transformer is to be protected by a differential protection. Draw the connection diagram. 2
7. Mention four advantages SF6 breaker over other circuit breakers. 3
8. Distinguish between fuse and a protective relay. 2
9. Mention four advantages of a Gas insulated substation over air insulated substation. 3
10. What is meant by insulation coordination ? 2



PART – B

(50 Marks)

11. Derive the generalised equation of a two input phase comparator. Obtain the necessary inputs for obtaining characteristics of impedance relay and reactance relay. 10
12. a) Explain what is meant by restriking and recovery voltages. 4
- b) For a 132 KV system, the reactance and capacitance upto the location of the circuit breaker is 3 Ohms and $0.015 \mu\text{F}$ respectively. Calculate the following : 6
- a) The frequency of transient oscillation.
- b) The maximum value of restriking voltage across the contacts of the circuit breaker.
- c) The maximum value of RRRV.
13. a) Explain the protective scheme for protection of ring mains. 5
- b) Explain the various blocks of inverse time over current relay with the help of a block diagram. 5
14. With the help of a neat diagram, explain the working of an induction type directional over current relay. Also plot its V-I characteristic. 10
15. a) Explain, what do you understand by percentage differential protection ? 5
- b) What is split phase protection ? 5
16. With the help of neat diagram, explain the working of expulsion type lightning arrester. 10
17. Write short notes on **any two** of the following : 10
- i) Air blast circuit breaker .
- ii) Peterson coil
- iii) Buchholz Relay.