EX - 603

B.E. VI Semester

Examination, December 2014

Switchgear and Protection

Time : Three Hours Maximum Marks : 70

Note: i) Attempt any one question from each unit.

ii) All questions carry equal marks.

Unit - I

1. What do you understand by positive, negative and zero sequence impedances? Discuss them with reference to synchronous generators, transformers and transmission lines.

b) Discuss briefly various systems of connecting current limiting reactors in a power system.

OR

2. a) Draw the sequence network for a double line to ground fault at the terminals of an unloaded alternator to find fault current in terms of equivalent sequence impedances.

b) A 3-phase transmission line operating at 10kV and having a resistance of 1C2 and reactance of 4Q is connected to the generating station bus-bars through 5MVA step-up transformer having a reactance of 5%. The bus-bars are supplied by a 10MVA alternator having 10% reactance. Calculate the short circuit KVA fed to the symmetrical fault between phases if it occurs at the high voltage terminals of the transformer.

Unit - II

3. a) What are the main features of a good protective system? What is meant by a relay?

b) Describe with the help of neat diagram the working principle of an over current relay.

OR

4. a) Describe and define the following terms:

i) Pick-up ii) Drop-off iii) Drop off/pick up ratio.

b) Describe the operating principle and characteristics of mho relay.

Unit -III

5. a) Discuss the selection of circuit breakers for different ranges of system voltages.

b) Discuss how breaking capacity and making capacity of a circuit breaker are tested in a laboratory type testing station.

OR

6. Describe the constructional details of SF6 circuit breaker and its operation. Give its advantages and disadvantages.

Unit -IV

7. a) What are the abnormal conditions in a large alternator against which protection is necessary? Discuss them briefly.

b) Explain inter locked over current protection in the transformer protection scheme.

OR

8. a) Discuss the different transformer faults. What are the various protection schemes available for transformers?

b) Explain with neat circuit diagram the percentage differential protection of an alternator.

Unit - V

9. a) Discuss the importance of the protective scheme employed against lighting and switching surges.

b) Enumerate the basic ideas of insulation coordination.

OR

10. a) What are the different types of earthing made in power system? Give the circuit diagram for Arc-suppression coil earthing and explain its principle.

b) Draw neat diagram of Horn gap expulsion type lightning arrester and explain its operation.