

Roll No

EX-603

B.E. VI Semester

Examination, December 2016

Switchgear and Protection

Time : Three Hours

Maximum Marks : 70

- Note:* i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each question are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
iv) Except Numericals, Derivation, Design and Drawing etc.

Unit-I

1. a) Explain the importance of per unit system.
b) What are symmetrical components? Write the symmetrical components of three phase system.
c) Express the symmetrical components V_{a1} , V_{a2} , V_{a0} in terms of unbalanced vectors V_a , V_b and V_c .
d) What are the various types of faults? Discuss their frequency of occurrence and severity.

OR

Write about the impedances in phase and sequence form.

Unit-II

2. a) What are over and under current relays?
b) Differentiate between primary and back-up protection.

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- c) Discuss the advantages and disadvantages of static relays compared to electromechanical relay.
- d) What is universal torque equation? Using this equation derive the following characteristics.
 - i) Impedance relay
 - ii) Reactance relay
 - iii) Mho relay

OR

Explain clearly the basic principle of operation of a percentage differential relay for an internal fault.

Unit-III

- 3. a) What is the main problem of the circuit breaker?
- b) What are the characteristic of SF_6 gas?
- c) What are the advantages and disadvantages of MOCB over a bulk oil circuit breaker?
- d) Describe construction, operating principle and application of vacuum circuit breaker for what voltage range is it recommended.

OR

What are the different methods of testing of circuit breakers? Discuss their merits and demerits.

Unit-IV

- 4. a) Mention the short comings of merz price scheme of protection applied to a power transformer.
- b) Mention any two disadvantage of carrier current scheme for transmission line only.
- c) What is transverse protection of an alternator?
- d) What type of protective device is used for the protection of an alternator against overheating of its :
 - i) Stator
 - ii) Rotor

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OR

Draw and explain the merz price protection of alternator stator winding.

Unit-V

- 5. a) What are the causes of over voltages in an electrical system?
- b) What is surge absorber or modifier?
- c) What is lightning? Describe the mechanism of lightning discharge in short.
- d) Why is insulation co-ordination needed in a large power system? What is meant by Basic Impulse Level (BIL) of an equipment?

OR

How do earthing screen and ground wires provide protection against direct lightning strokes?
