

[4]

- d) What is tower-footing resistance? What are the methods to reduce this resistance? Why is it required to have this resistance as low as economically feasible?

OR

What are the advantages of neutral grounding? Explain the various methods of neutral grounding.

Total No. of Questions : 5]

[Total No. of Printed Pages : 4

Roll No

EX - 603**B.E. VI Semester**

Examination, June 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) State the advantages of per unit system.
- b) During analysis of power system, how short and medium transmission lines are represented?
- c) What are the different shunt faults that occur in a power system?
- d) The line-to-ground voltages on the high voltage side of a step-up transformer are 100 kV, 33kV and 38kV on phases a, b and c respectively. The voltage of phase a leads that of phase b by 100° and lags that of phase c by 176.5° . Determine analytically the symmetrical components of voltage.

OR

[2]

Derive the procedure to calculate average three phase power in terms of symmetrical components.

Unit - II

2. a) What are the different essential features of a relay?
- b) Define TMS and PSM.
- c) What are the advantages and disadvantages of static relay over electromechanical relay?
- d) What are the advantages of induction relays? With suitable phasor diagram derive the torque equation of induction relay.

OR

What are the advantages of distance relay over overcurrent relay? Explain three step protection system?

Unit - III

3. a) What do you mean by resistance switching?
- b) What are the different tests performed under short circuit test?
- c) In a system of 132 kV, the line to ground capacitance is $0.01 \mu\text{F}$ and the inductance is 5 henries. Determine the voltage appearing across the pole of a C.B. if a magnetising current of 5 amps (instantaneous value) is interrupted. Determine also the value of resistance to be used across the contacts to eliminate the restriking voltage.

[3]

- d) Describe the construction, principle of operation application and advantages of a vacuum circuit breaker.

OR

Describe the construction, principle of operation application and advantages of a SF_6 circuit breaker.

Unit - IV

4. a) What is magnetizing inrush current?
- b) Why reverse power relays are used?
- c) What are the different protection schemes used for the protection of generator?
- d) Explain the working principle of Buchholz relay in protection of power transformer?

OR

What measures are taken to distinguish between the fault current and magnetizing inrush current? Discuss the protective scheme which protects the transformer against faults but does not operate in case of magnetizing inrush current?

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Unit - V

5. a) Name two devices that are used for external overvoltage system protection.
- b) What are the different classes of lightning arresters?
- c) What are volt-time curves? What is their significance in power system studies?