

USN

--	--	--	--	--	--	--	--	--	--

10EE62

Sixth Semester B.E. Degree Examination, June/July 2017
Switch Gear and Protection

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

1.
 - a. Draw the single line diagram to connect a CB, Isolator, Earthing switches and write the sequence of operation while opening and closing of a circuit. (06 Marks)
 - b. With neat sketch describe the working principle of a liquid fuse. (06 Marks)
 - c. Explain the cut-off characteristics and time – current characteristics of a fuse. (08 Marks)
2.
 - a. Explain recovery rate theory related to current zero method of arc interruption. (06 Marks)
 - b. Derive an expression for restriking voltage and rate of rise of restriking voltage of circuit breaker. (07 Marks)
 - c. For a 132KV system, the reactance and capacitance upto the location of the circuit breaker is 3Ω and $0.015 \mu F$ respectively. Calculate the following :
 - i) The frequency of transient oscillation.
 - ii) Maximum value of restriking voltage across the contacts of the circuit breaker and
 - iii) Maximum value of rate of rise of restriking voltage. (07 Marks)
3.
 - a. With a neat sketch, explain the operating principle of axial air blast circuit breaker. (06 Marks)
 - b. Sketch and explain the working principle of buffer type of sulphur hexa fluoride circuit breaker. (06 Marks)
 - c. Explain the procedure adopted in unit test and synthetic testing of circuit breaker. (08 Marks)
4.
 - a. Explain the construction and working of a vacuum circuit breaker. (10 Marks)
 - b. What are the types of lightning strokes? Explain each of them. (06 Marks)
 - c. State the essential requirements of a surge diverters. (04 Marks)

PART – B

5.
 - a. What is a relay? Define i) Pickup level ii) Burden iii) Chop out, with respect to relay. (04 Marks)
 - b. State and briefly explain the characteristics of good protective relaying. (08 Marks)
 - c. With a neat sketch, explain the working of induction type directional over current relay. (08 Marks)
6.
 - a. Explain the working principle and characteristics of an impedance relay. (08 Marks)
 - b. With a suitable diagram, explain a negative sequence relay and mention its applications. (08 Marks)
 - c. What are the advantages of microprocessor based protective relays over electromagnetic and static relays? (04 Marks)

- 7 a. Explain the protection of a generator against :
i) Loss of excitation ii) Stator inter turn fault and iii) Over speeding. (12 Marks)
- b. The neutral point of a 10,000V alternator is earthed through a resistance of 10Ω , the relay is set to operate when there is an out of balance current of 1A. The CT's have a ratio of 1000/5. What percentage of the winding is protected against fault to earth and what must be the minimum value of earthing resistance to give 90% protection to each phase winding? (08 Marks)
- 8 a. Describe the harmonic restraints relay use to protect the transformer. (08 Marks)
- b. Explain single phasing in induction motors. How motor is protected from single phasing? (08 Marks)
- c. List the various abnormal conditions against which large induction motor has to be protected. (04 Marks)
