FACULTY OF ENGINEERING

B.E. 3/4 (EEE) II – Semester (New) (Main) Examination, May 2013

Subject : Switch Gear and Protection

Time : 3 hours   Max. Marks : 75

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

PART – A (25 Marks)

1. Define :
   i) Pick-up value   ii) Operating time and   iii) Setting value of a protective relay   3

2. Write the advantages of static relays over electromagnetic relays.   2

3. Explain the operating principle of an impedance relay.   3

4. Draw the simplified block diagram of static inverse time over current relay.   2

5. With a neat sketch, write the working principle of transverse protection of alternator.   3

6. What is magnetizing inrush current?   2

7. In a 132 KV system, the inductance and capacitance upto the location of circuit breaker are 0.4 H and 0.015 µF respectively. Determine the maximum rule of the restriking voltage across the contacts of the circuit breaker and maximum value of RRRV.   3

8. What is resistance switching?   2

9. Write the causes of over voltages.   2

10. Compare the time-current characteristics of inverse, very inverse and extremely inverse current relays.   3

PART – B (50 Marks)

11.a) With a neat diagram, explain the protective scheme for ringmain system.   5

   b) Derive the equation for the Torque developed by induction type relay.   5

12. Explain stepped time-distance characteristics of three distance relays units used for I, II and III zone protection.   10

13.a) With a neat diagram explain the percentage differential protection scheme of protection of stator of alternator.   5

   b) What is magnetizing inrush currents? Discuss the protective scheme which protects the transformer against faults but does not operate incase of magnetizing inrush current.   5

14.a) Explain how arc is initiated and sustained in a circuit breaker when the circuit breaker contacts separate.   5

b) Discuss two methods of arc interruption in circuit breakers.   5

15.a) What is ground wire? How do ground wires protect the overhead lines against direct lightening strokes?   5

b) Describe the construction and principle of operation of value type lightening arrestor.   5

16.a) Derive an expression for restriking voltage and rate of rise of restriking voltage of a circuit breaker.   7

b) Why IDMT relays are widely used for over current protection?   3

17. Write short notes on :
    a) Buchholz relay and
    b) Rating of circuit breakers

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