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Sixth Semester B.E. Degree Examination, December 2010
Switch Gear and Protection

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.**

PART - A

- 1 a. Explain the differences between isolating switch and load break switch. (04 Marks)
- b. With a neat sketch, explain the time-current and cut-off characteristics of HRC fuse. (08 Marks)
- c. Explain in detail, the two theories of arc interruption in circuit breaker. State the assumptions made. (08 Marks)
- 2 a. Define the following terms as applied to circuit breaker:
i) Restriking voltage ii) RRRV. (04 Marks)
- b. Describe the principle of resistance switching and derive the value of the critical resistance where L & C are inductance and capacitance per phase of the system respectively upto the C.B. location point. (08 Marks)
- c. For a 132 kV, 50 Hz system, the reactance and capacitance upto the location of circuit breaker are 3 Ω and 0.015 μf respectively. Calculate the following :
i) Frequency of transient oscillations.
ii) Maximum value of restriking voltage across the contacts of the circuit breaker.
iii) Maximum value of RRRV. (08 Marks)
- 3 a. Explain the phenomena of current chopping with wave forms. (06 Marks)
- b. What are the advantages and disadvantages of (i) bulk oil circuit breaker (ii) minimum oil circuit breaker. (08 Marks)
- c. With a neat sketch, explain the working of axial blast air circuit breaker. (06 Marks)
- 4 a. With a neat sketch, explain the construction and working of vacuum circuit breaker. (08 Marks)
- b. Mention the ratings specified for a circuit breaker. (04 Marks)
- c. Mention the different types of short-circuit testing stations and write the schematic diagram of a short-circuit test plant. What is the function of master circuit breaker in the test plant? (08 Marks)

PART - B

- 5 a. What is a relay? Define (i) pick up level (ii) burden (iii) drop out, with respect to relays. (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)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 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 interturn 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 1 A. The CTs 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. What measures are taken to distinguish between the fault current and magnetizing inrush current? With a neat sketch, discuss the protective scheme which protects the transformer against faults but does not operate in case of magnetizing inrush current. (10 Marks)
- b. With a neat sketch, explain the working of a Buchholz relay and state its limitations. (10 Marks)

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