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Sixth Semester B.E. Degree Examination, Dec.2016/Jan.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. State and explain fuse law. With a neat sketch explain the time-current and cut-off characteristics of HRC fuse. (10 Marks)
- b. Draw and explain a line diagram of substation with use of isolating switches. Mention operating instructions and applications of isolating switches. (10 Marks)
- 2 a. What are Slepian's and Cassie's theorem of arc interruption? Explain with neat sketches. Also explain low resistance or zero point extinction. (10 Marks)
- b. How interruption of capacitive currents takes place in AC circuit breakers? Explain. (10 Marks)
- 3 a. With a neat sketch explain the construction and working of air break circuit breaker. (10 Marks)
- b. Describe the working principle of SF₆ circuit breaker with the help of a neat sketch. mention the advantages over other type of circuit breakers. (10 Marks)
- 4 a. Explain the construction and working of a vacuum circuit breaker. (10 Marks)
- b. Describe : i) unit testing ii) synthetic testing of a circuit breaker. (10 Marks)

PART – B

- 5 a. What are the requirements of protective relaying? And discuss i) zones of protection ii) primary and back-up protection. (10 Marks)
- b. Briefly explain the essential qualities and classification of protective relays. (10 Marks)
- 6 a. Explain in detail with the help of a neat figure the working of non-directional induction type over-current relay. (10 Marks)
- b. Explain the principle of working and operating characteristics of a percentage biased differential relay. (10 Marks)
- 7 a. What are the important faults that can occur in an alternator during operation? Explain in detail. (10 Marks)
- b. A generator is protected by restricted earth fault protection. The generators ratings 13.2 KV, 10 MVA. The percentage of winding protected against phase to ground fault is 85%. The relay setting is such that it trips for 20% out of balance. Calculate the resistance to be added in the neutral to ground connection. (10 Marks)
- 8 a. With a neat sketch explain the working of a Buchholz relay for transformer protection and state its limitations. (10 Marks)
- b. A three phase power transformer having a line voltage ratio of 400 V to 33 KV is connected in star-delta. The CTs on 400 V side have current ratio as 1000/5. What must be the CT ratio on 33 KV side? Show the star-delta arrangement with CT connections. Assume current on 400 V side of transformer to be 1000 A. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification number to evaluator and/or examination written or 47+8 = 50 will be treated as malpractice.