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10EE62

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 SF_6 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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