

R09

Code No: 09A70201

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, May/June - 2013

Switchgear and Protection

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions

All Questions Carry Equal Marks

- 1.a) Explain how the arc is initiated and sustained in a circuit breaker when the circuit breaker contacts separated.
- b) In a short circuit test on a 132 kV three phase system the breaker gave the following results: p.f of the fault: 0.4, recovery voltage 0.90 of full line value. The breaking current is symmetrical and the re-striking transient had a natural frequency of 20 kHz. Determine the average rate of rise of re-striking voltage. Assume that the fault is grounded. [15]
2. Explain the construction and operation of SF₆ circuit breaker with a neat sketch. What are the advantages of SF₆ circuit breaker over other circuit breakers? [15]
- 3.a) Explain the different structures used for mho relay.
- b) Explain the characteristics of mho relay.
- c) Differentiate between static and electromagnetic relays. [15]
- 4.a) A 6.6 kV, 5 MVA star connected generator has a reactance of 1.5 ohm per phase and negligible resistance. Merz-Price protection scheme is used which operates when the out of balance of the current exceeds 25% of the full load current. The neutral of the generator is grounded through a resistance of 8 ohms. Determine the proportion of the winding which remains un-protected against earth fault. Show that the effects of alternator reactance can be ignored.
- b) Discuss the generator protection schemes for
 - i) Loss of excitation
 - ii) Overload
 - iii) loss of prime mover.[15]
- 5.a) Describe the construction, principle of operation with a neat sketch and applications of Buchholz's Relay? Why this form of protection is ideal for transformer?
- b) A 3-phase 66/ 11 kV star delta connected transformer is protected by Merz-piece protection scheme. The CTs on the LT side have a ratio of 420/5 amps. Find the ratio of CTs on the HT side. [15]
- 6.a) Explain three zone protection scheme using impedance relays.
- b) Explain carrier current protection scheme with neat diagrams. [15]
7. What is neutral grounding? What is its necessity? Explain various methods of neutral grounding? [15]
- 8.a) Explain the construction and working of valve type lightning arresters.
- b) Discuss about lightning arrester ratings. [15]

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