2002 SCHEME

USN | | | | | | | | | |

EE63

Sixth Semester B.E. Degree Examination, Dec 08 / Jan 09
Switch Gear and Protection

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Discuss the recovery rate theory and energy balance theory of arc interruption in a circuit breaker. **(07 Marks)**

b. Derive an expression for restriking voltage and RRRV in terms of system voltage, inductance and capacitance. What measures are taken to reduce them? **(08 Marks)**

c. What is resistance switching? Derive the expression for critical resistance for no transient oscillation. **(05 Marks)**

2 a. A 3ϕ alternator has the line voltage of 11kV. The generator is connected to a circuit breaker. The inductive reactance upto the circuit breaker is 5Ω/phase. The distributed capacitance upto circuit breaker between phase and neutal is 0.01μf. Determine the following Neglect First pole to clear factor i) Peak Restriking voltage across the breaker. ii) Frequency of the restriking voltage across the breaker iii) Average rate of restriking voltage upto peak restriking voltage iv) Maximum RRRV. **(08 Marks)**

b. What are the advantages of air blast circuit breaker over oil circuit breaker? **(04 Marks)**

c. Discuss the properties of SF_6 gas and explain any one type of SF_6 breaker with a neat sketch. **(08 Marks)**

3 a. Explain the terms as applied to circuit breaker. **(10 Marks)**
i) Symmetrical Breaking current ii) Rated making capacity iii) Rated short time current.

b. Explain with a neat layout sketch the procedure of Indirect tubing of circuit breaker. **(10 Marks)**

4 a. Explain the construction, working advantages and disadvantages of vacuum circuit breaker. **(10 Marks)**

b. Explain the cut – off and time current characteristics with respect to HRS fuse. Discuss its merits and demerits. **(10 Marks)**

5 a. With respect to the protective relying, discuss i) zones of protection ii) primary and backup protection. **(10 Marks)**

b. Explain clearly with neat figure the working principle of i) Attracted armature relay ii) Solenoid and planger type relay. **(10 Marks)**

6 a. Discuss the Merz – price protection for transformer. **(10 Marks)**

b. The neutral point of a 3ϕ 20 MVA, 11kV alternator is earthed through a resistance of 5Ω. The relay is set to operated when there is an out of balance current of 1.5A. The CTs have a ratio of 1000/5. What percentage of winding is protected against an earth fault and what should be the minimum value of earthing resistance to protect 90% of the winding? **(10 Marks)**

7 a. Plot the characteristic of :
i) Impedance relay ii) Admittance relay iii) Reactance relay.
On the same R – X diagram, all of them set to the same reach. **(10 Marks)**

b. Discuss how generators are protected against i) field failure ii) loss of synchronism and iii) winding faults. **(10 Marks)**

8 Write explanatory notes on any four of the following:
a. IDMT characteristics b. Current chopping c. Buchhol'z relay d. Thermal relay e. Carrier aided distance protection. **(20 Marks)**

*****