Code No: 117HX

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, November/December - 2018
SWITCH GEAR AND PROTECTION
(Electrical and Electronics Engineering)

Time: 3 Hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	What is the use of circuit breakers?	[2]
b)	What is meant by recovery voltage and restriking voltage?	[3]
c)	What is meant by MHO relay?	[2]
d)	What are the advantages of static relays over electromagnetic relays?	[3]
e)	What is differential protection?	[2]
f)	How do you protect generator against stator faults?	[3]
g)	What is earthing? What is its need?	[2]
h)	What is arcing grounds?	[3]
i)	What are the main lightning protections schemes?	[2]
j)	What are the switching over voltages.	[3]

PART-B

(50 Marks)

2.a)   What is a vacuum circuit breaker? Explain its working principle.
  b)   Discuss the operation, advantages and applications of SF_6 circuit breaker.   [4+6]
OR
3.a)   Define RRRV? Explain the calculation of average and Maximum RRRV.
  b)   In a short circuit test on 130kV, three-phase system, the circuit breaker gave the following results: p.f. of fault: 0.45; recovery voltage 0.95 times full line voltage, breaker current symmetrical and restriking transient had a natural frequency 16kHz. Determine average RRRV. Assume fault is grounded.   [4+6]

4.   What is a relay? What are different types of relays? Explain the operation of induction disc type electromagnetic relay.   [10]
OR
5.   What are distance relays? What are the applications of distance relays? Discuss the effect of line length and source impedance on distance relays.   [10]

6.a) What are the main faults that occur in generators? Explain the protection of generators against rotor faults.

b) The neutral point of a 11 kV alternator is earthed through a resistance of 12Ω, the relay is set to operate when there is out of balance current of 0.8 A. The C.T.s have a ratio of 200/5. What percentage of the winding is protected against earth faults? What must be the minimum value of earthing resistance required to give 90% of protection to each phase? [5+5]

OR

7.a) What is a Buchholtz relays? Explain its operation.

b) The primary winding of a transformer has 2000 turns and CT ratio is 600:5. The secondary has 10000 turns and is working on a tap of 60%. Find out CT ratio required for secondary side to establish circulating current scheme. [5+5]

8.a) What are the faults that occur in transmission system? List different protection schemes used in transmission systems.

b) What is a Translay Relay? Explain its operation. [5+5]

OR

9.a) Explain the resistance grounding scheme and mention its advantages and disadvantages.

b) What is reactance grounding? Mention its disadvantages. [5+5]

10.a) What are lightning over voltages? Explain its causes.

b) What are lightning arresters? Explain its working principle. [5+5]

OR

11.a) Explain the purpose of insulation coordination.

b) Explain the working of Zinc oxide (ZnO) surge arresters. [5+5]

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