Code No: 117HX **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, November/December - 2016
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) Define restriking voltage and recovery voltage. [2]
b) Mention the details circuit breaker rating [3]
c) What are the differences between primary protection and back up protection? [2]
d) What is a static relay? [3]
e) What are the errors in CT? [2]
f) What problems occur due to differential protection in power transformer and how are they eliminated? [3]
g) Explain why feeders should be protected. [2]
h) What are the effects of ungrounded neutral on system performance? [3]
i) What is off-set mho relay? [2]
j) Write short note on Insulation coordination. [3]

PART-B

(50 Marks)

2. Explain the following in details:
a) Symmetrical breaking capacity.
b) Asymmetrical breaking capacity. [5+5]

OR

3. Explain the operation of SF_6 Circuit breaker with the help of a neat sketch. Mention the advantages of SF_6 circuit breaker. [10]

4.a) Explain the merits and demerits of static relays.
b) What are the types of over current relays? Sketch the characteristics and explain. [5+5]

OR

5.a) Derive the Universal Torque equation of relay.
b) Compare Directional relay and Differential relay. [5+5]

6.a) Explain the operation of Buchholtz relay with a neat diagram.
b) A 3-phase transformer rated for 33kV/6.6kV is connected star-delta and the protecting current transformer on the low voltage side have a ratio of 400/5. Determine the ratio of the current transformer on the HV side. [5+5]

OR

7. A 6.6 kV, 4000 kV A star connected alternator with a transient reactance of 2 Ω per phase and negligible resistance, is protected by a circulating current protective system. The alternator neutral is earthed through a resistor of 7.5Ω. The relays are set to operate when there is an out of balance current of 1 A in the secondary windings of the 500/5 current transformers. What percentage of each phase winding is protected against an earth fault? [10]

8.a) What is Translay protection? Explain a scheme of protection for 3-phase transmission line.

b) Discuss the protection of a parallel feeder. [5+5]

OR

9.a) Explain the necessity of grounding.

b) Discuss about arcing grounds and grounding practices. [5+5]

10.a) Describe the construction and principle of zinc oxide lightning arresters.

b) Sketch Volt-Time characteristics and explain. [5+5]

OR

11.a) Explain the construction and working of valve type arrestor.

b) State the external and internal causes of over voltage. Explain its ill effect in the power system. [5+5]

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