

Code No: 117HX

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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. [5+5]
 - b) Asymmetrical breaking capacity.

OR

3. Explain the operation of SF₆ Circuit breaker with the help of a neat sketch. Mention the advantages of SF₆ circuit breaker. [10]

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

OR

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

6. a) Explain the operation of Buchholz relay with a neat diagram. [5+5]
- 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.

OR

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7. A 6.6 kV, 4000 kVA star connected alternator with a transient reactance of 2Ω 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 arrester.
b) State the external and internal causes of over voltage. Explain its ill effect in the power system. [5+5]

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