Code No: 156CM

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, August/September - 2021
POWER SYSTEM PROTECTION
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) What are the advantages of static relays over electromagnetic relays?
 b) The current rating of an overcurrent relay is 5A. The relay has a plug settings of 150% and the time setting (TMS) of 0.4. The CT ratio is 400/5. Determine the operating time of the relay for a fault current of 6000A. At TMS=1, operating time at various PSM are given in the below table. [7+8]

PSM	2	4	5	8	10	20
Operating time in seconds	10	5	4	3	2.8	2.4

2.a) Explain the concept of primary and back up protection.
 b) List and explain the essential qualities of a protective relay. [7+8]

3. With a neat circuit diagram, explain directional earth fault relay. [15]

4. Explain the working principle, torque equation and operating characteristics of impedance relay. [15]

5. Explain about percentage differential protection of transformers. [15]

6. Explain the negative sequence protection of an alternator against unbalanced loads. [15]

7. Explain the working of static directional relay with a neat circuit diagram. [15]

8.a) With neat sketches, explain the recovery rate theory of arc interruption in a circuit breaker.
 b) Explain the phenomenon of current chopping in a circuit breaker. [8+7]

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Code No: 136EA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester (Special) Examinations, January/February - 2021
SWITCH GEAR AND PROTECTION
(Electrical and Electronics Engineering)

Time: 2 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1. Compare the features of SF6, Air Blast CB, Oil CB, and Vacuum CB.   [15]

2. What is resistance switching? And derive the expression for the value of resistance to
    be inserted to reduce RRRV.   [15]

3. Explain in detail about the working of Induction disc type relay with a neat sketch.[15]

4. What is universal torque equation? Using this equation derive the characteristics of
    a) Impedance relay b) mho relay.   [15]

5. Explain in detail about Buchholtz relay with a neat sketch.   [15]

6. Explain the protection of generators against stator faults and rotor faults.   [15]

7. State the advantages of neutral grounding of an electrical system. Explain different
    methods neutral grounding.   [15]

8. Discuss the causes of over voltages in a power system.   [15]

---ooOoo---

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, November/December - 2020
SWITCH GEAR AND PROTECTION
(Electrical and Electronics Engineering)

Time: 2 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a) Explain about the Symmetrical breaking capacity.
 b) Explain the working of Minimum-oil circuit breakers.   [6+9]

2.   Explain the working of SF6 circuit breakers.   [15]

3.   Write a short note on the principle of working of (a) induction relays (b) induction cup
     relays.   [7+8]

4.a) Derive the Universal Torque equation of relay.
 b) Compare static relays and electromagnetic relays.   [8+7]

5.a) Explain the operation of Buchholtz relay with a neat diagram.
 b) What are the abnormal conditions in a large alternator against which protection in
     necessary?   [9+6]

6.   Explain the principle of Merz-Price system of protection used for power transformers.
                                                                        [15]

7.   Describe, with a neat diagram, a circulating-current protection scheme for a 3-phase,
     1MVA, 11KV/400 volts delta-star transformer. If the current transformers have a
     nominal secondary current of 5 amps, calculate their ratios.   [15]

8.   State the external and internal causes of over voltage. Explain its ill effect in the power
     system.   [15]

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R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, May - 2019
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 value of Resistance connected across the contacts of CB in Resistance
switching so, that no oscillations will occur and why Resistance switching is employed?
[2]
b) Define restriking voltage.   [3]
c) What are the objectives of protection system?   [2]
d) What is universal torque Equation and express the terms in it?   [3]
e) What is three zone distance relay protection?   [2]
f) Write a short note on Buchholtz Relay protection used in transformer.   [3]
g) What are the advantages of neutral grounding?   [2]
h) What is solid grounding? What are its advantages?   [3]
i) What is BIL?   [2]
j) What are the requirements of a good lightning arrester?   [3]

PART - B

(50 Marks)

2.a) Explain in detail about SF6 circuit breaker with a neat circuit diagram.
b) For a 132 V system, the reactance and the capacitance up to the location of CB is
3ohms and 0.015 micro farad, respectively. Find i)The frequency transient oscillation
ii) Maximum value of the restriking voltage iii)Maximum value of RRRV.   [5+5]
OR
3.a) Describe with the aid of neat sketch the working of a air blast circuit breaker.
b) Explain the phenomenon of current chopping and its effect on circuit interruption. Why
is it more common in an air blast circuit breaker than in oil circuit breaker?   [5+5]

4.a) What is an impedance relay? Discuss its principle of operation. What is the merit of this
relay for transmission line protection?
b) What are the various types of over current relays? Discuss their area of applications.
[5+5]

OR
5.a) Explain the characteristics of distance relays.
b) Explain the requirement of primary and back up protection in any equipment.   [5+5]