Code No: 137SD **RA**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, January/February - 2023
SWITCH GEAR AND PROTECTION
(Electrical and Electronics Engineering)

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

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions

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PART – A

(25 Marks)

1.a)	Define rate of rise of recovery voltage.	[2]
b)	What is meant by arc interruption? What are the elementary principles of it?	[3]
c)	Write the application of over current relays	[2]
d)	What are the characteristics of Distance Relays?	[3]
e)	What is the need for protection equipment in generators	[2]
f)	What are the problems arising in differential protection in power transformer and how are they overcome?	[3]
g)	What are the advantages and disadvantages of solid grounding?	[2]
h)	What is the difference between solidly grounded and effectively grounded?	[3]
i)	What is meant by impulse ratio of any lightning arrester?	[2]
j)	What is basic insulation level BIL? How it is calculated	[3]

PART – B

(50 Marks)

2.a) Describe the construction, operating principle of Vacuum Circuit breaker.
b) Explain the phenomenon of current chopping and its effect on circuit interruption. [5+5]

OR

3.a) Enumerate various types of ratings of a circuit breaker. Discuss symmetrical and asymmetrical breaking capacity, making capacity and short-time current rating.
b) What is meant by circuit breaker? Discuss the phenomenon of arc formation in a CB. [5+5]

4.a) What are the advantages of static relays over electromagnetic relays?
b) What is an impedance relay? Discuss its principle of operation. Show its characteristics on R-X diagram. [5+5]

OR

5.a) Explain the operating principle and characteristics of MHO and Offset MHO relay.
b) Discuss the construction and operation of attracted armature relay. [5+5]

6.a) What is carrier current protection? For what voltage range is it used for protection of transmission lines?

b) What is Buchholz relay? Which equipment is protected by it? Discuss its working principle. [5+5]

OR

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

b) With a neat sketch, discuss the differential scheme for busbar protection. [5+5]

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

b) Discuss the effects of grounded and ungrounded neutral systems. [5+5]

OR

9.a) What are the different types of grounding? Explain the reactance grounding?

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

10.a) Discuss the construction and principle of operation of Zinc Oxide lightning arrester.

b) Explain the term insulation coordination. Describe the construction of volt-time curve and the terminology associated with impulse testing. [5+5]

OR

11.a) Explain the working of valve type lightning arrester.

b) What are the causes of over voltages arising on a power system? Why is it necessary to protect the lines and the equipment of the system against over voltages? [5+5]

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