R16

Code No: 136EA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, July - 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.

PART – A

(25 Marks)

1.a)	Give the basic function of a circuit breaker.	[2]
b)	State different C. B ratings.	[3]
c)	What is over current a relay?	[2]
d)	List out the differences between biased differential relay and differential relay.	[3]
e)	What are inter turn faults in an alternator?	[2]
f)	What are various faults that occur in auxiliary equipment of a transformer?	[3]
g)	What is ungrounded neutral of the system? State its disadvantages?	[2]
h)	What are the advantages and disadvantages of reactance grounding?	[3]
i)	What are various methods used for protection of system against over voltages?	[2]
j)	Define BIL. Give its significance.	[3]

PART – B

(50 Marks)

2.a) Briefly discuss about the characteristics of an arc in a circuit breakers.
b) In short circuit test on a three pole, 132kV circuit breaker, the following observations are made power factor of the fault is 0.3, the recovery voltage is 0.9 times the full line value, the breaking current is symmetrical, the frequency of oscillations of restriking voltage is 16kHz. Assuming the neutral is grounded and the fault is not grounded. Find the average value of RRRV? [5+5]

OR

3.a) Explain the working of Air blast circuit Breakers.
b) State the advantages of SF_6 circuit Breakers. [5+5]

4.a) With a neat diagram, explain the directional and voltage current characteristics of a directional relay.
b) Draw a neat diagram and explain the working of a Mho relay. [5+5]

OR

5.a) With the help of example discuss the concepts of current settings and time settings of the relay.
b) List out the differences between static relays and electromagnetic relays. [5+5]

6.a) Briefly discuss about the differential protection of busbars.

b) A three phase transformer having a line voltage ratio of 400/33kV is connected in star-delta. The CTs on the 400V side have a ratio of 800/5. Find the ratio of CTs on the 33kV side? Draw the connection diagram also. [5+5]

OR

7.a) Explain briefly about three-zone distance relay protection using impedance relays.

b) A three phase, 10MVA, 6.6kV generator is delivering a load of 7.5MW at 0.6 power factor. Find the value of neutral resistance if 15% of the winding is unprotected. The relay setting is 20%. The per phase reactance is 10%? [5+5]

8.a) Explain about the Arcing grounds.

b) Briefly discuss about resistance grounding and give its merits and limitations. [5+5]

OR

9.a) Give the differences between grounded and ungrounded neutral systems.

b) What are the common grounding practices to be implemented in the neutral grounding? [5+5]

10.a) Write a short notes on protection against over voltages in power systems.

b) Explain the differences between direct and indirect lightning strokes with diagrams. [5+5]

OR

11.a) What is an impulse wave and give the specifications of standard impulse test wave?

b) Explain the principle of operation of zinc oxide gapless arrester with a neat diagram. [5+5]

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