BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : ADD**
BRANCH: EEE **SESSION : MO/2024**

SUBJECT: EE401 SWITCHGEAR AND PROTECTION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Explain the term resistance switching in CB.	[2]	2	2
Q.1(b)	Discuss various advantages of SF6 gas as insulating an arc quenching medium.	[3]	2	1
Q.1(c)	With a neat diagram, explain the components and operation of a vacuum CB. Also discuss its advantages and applications.	[5]	2	3
Q.2(a)	Explain the terms current setting, pickup value and time setting for an over current relay.	[2]	1	2
Q.2(b)	With the help of suitable characteristic, analyze the difference between the operating time for different types of over current relays.	[3]	2	4
Q.2(c)	An IDMT type over current relay is used to protect a feeder through CT of 500/1 ratio. The relay has plug setting of 125% and TMS of 0.3. Find the time of operation of the relay if the fault current is 5000A. The relay characteristic for TMS=1 is given below:	[5]	5	5

PSM	2	3	5	8	10	15
Time	10	6	4.5	3.2	3	2.5

Q.3(a)	Explain the importance and complexities associated with the generator protection.	[2]	1	2
Q.3(b)	Draw and explain the scheme used for the protection of small motors.	[3]	3	3
Q.3(b)	Explain the condition of inter-turn faults in the generator. Draw and explain the Transverse protection scheme used to protect the generator from inter turn faults.	[5]	3	3
Q.4(a)	Explain the term incipient faults in the transformer. With neat sketch, explain the operation of Bucholz relay for the protection of transformer from incipient faults.	[5]	4	3
Q.4(b)	A three phase, 11/33kV star-delta transformer is protected by differential protection. The CTs on the LV side has a ratio of 400/5. Determine the CT ratio of HV side. Also draw the connections of the CTs of both side of transformer.	[5]	5	5
Q.5(a)	Explain the operating principle of distance protection with suitable diagram.	[2]	3	2
Q.5(b)	Discuss different types of pilots used in carrier current protection schemes.	[3]	4	1
Q.5(c)	Draw the connection diagram of three stepped distance protection using impedance relay. Explain the functioning of each unit for faults in different zones using the characteristic.	[5]	3	4

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