Course Code: 23EE6D03

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III-B.Tech II-Semester Regular Examinations (BR23), April/May -2026

SWITCHGEAR AND PROTECTION (EEE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B

*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Explain the fault clearing time of a Circuit Breaker	(2M)	CO1	BL2
b)	Explain the term Restriking voltage and write the formula for RRRV	(2M)	CO1	BL2
c)	Explain where and why you would prefer directional current relay.	(2M)	CO2	BL2
d)	What is an impedance relay	(2M)	CO2	BL1
e)	Write short notes on inter turn faults in an alternator.	(2M)	CO3	BL1
f)	Discuss various types of faults encountered in transformers	(2M)	CO3	BL2
g)	Explain the need for circulating current differential protection scheme for a single bus bar.	(2M)	CO4	BL2
h)	Explain the significance of phase comparator in static relays	(2M)	CO4	BL2
i)	Describe the Phenomenon of Lightning	(2M)	CO5	BL2
j)	Discuss the relative merits and demerits of Valve arresters and rod gaps	(2M)	CO5	BL2

PART–B (5X10 = 50M)

2a.	Describe the operation of Vacuum circuit breaker with diagram and list out its merits and demerits	10(M)	CO1	BL2
	(OR)			
3a.	Explain the various biasing techniques of the transistor and derive the necessary equations in each type.	5(M)	CO1	BL2
b	In a system having 220kV, the line to ground capacitance 0.018 microfarad, inductance 4.5 H. Find the voltage appearing across the pole of the circuit breaker if a magnetizing current of 8.5A instantaneous, is interrupted. Calculate also the value of resistance to be used across the contacts to eliminate the restriking voltage?	5(M)	CO1	BL1

4a.	Explain the construction and operating principle of Electromagnetic relays.	10(M)	CO2	BL2
	(OR)			
5a.	Explain the principle of distance relays stating clearly the difference between impedance relay, reactance relay and mho relay.	10(M)	CO2	BL2

6a.	An 11 kV, 100 MVA generator is provided with differential scheme of protection. The percentage of the generator winding to be protected against phase to ground fault is 80%. The relay is set to operate when there is 15% out of balance current. Determine the value of the	10(M)	CO3	BL2

	resistance to be placed in the neutral to ground connection.			
	(OR)			
7a.	What is Buchholz relay? Which equipment is protected by it? For what types of faults is it employed? Discuss its working principle.	5(M)	CO3	BL2
b	Explain the percentage differential protection of a Alternator	5(M)	CO3	BL2

8a.	Explain the frame leakage protection of bus bars with circuit diagram.	5(M)	CO4	BL2
b.	Explain with a neat sketch about the differential relay protection for three phase feeders.	5(M)	CO4	BL2
	(OR)			
9a.	Explain how the carrier current protection scheme is used for Feeder protection.	5(M)	CO4	BL2
b.	Explain the operation of Static over current relay with a neat block diagram.	5(M)	CO4	BL2

10a	Explain the following: i) Dry flashover voltage ii) Wet flash over voltage iii) Impulse flash over voltage iv)	10(M)	CO5	BL3
	(OR)			
11a	A 132 KV, three phase, 50 cycles, overhead line, 60 Km long has a capacitance to earth for each line of 0.0250 μF per Km. Determine the inductance and KVA rating of the arc suppression coil suitable for this system.	10(M)	CO5	BL2

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12/12/26