Course Code: 1960211 Roll No: **MLRS-R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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III B.Tech II Sem Supply End Examination, January 2023

Power System Protection

(Electrical and Electronics Engineering)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. 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

(10*2 Marks = 20 Marks)

1.	a)	Distinguish between primary protection and backup protection.	2M	CO1	BL1
	b)	Give applications of current transformer.	2M	CO1	BL1
	c)	Explain Instantaneous overcurrent relay.	2M	CO2	BL1
	d)	Write the advantages and disadvantages of ring main type feeder.	2M	CO2	BL1
	e)	With neat sketch explain differential current protection of bus-zone.	2M	CO3	BL1
	f)	Draw the circuit for protection of three-winding transformer with power source at one end.	2M	CO3	BL1
	g)	Discuss duality between amplitude and phase comparators.	2M	CO4	BL1
	h)	Mention the advantages over current relays.	2M	CO4	BL1
	i)	Why circuit breakers are designed to have a short-time rating?	2M	CO5	BL1
	j)	Name the different types of fuses.	2M	CO5	BL1

PART- B

(10*5 Marks = 50 Marks)

2	a)	What do you understand by a zone protection? Discuss various zones of protection for a modern power system.	5M	CO1	BL3
	b)	Classify the different types of electromagnetic relays. Discuss their field of applications.	5M	CO1	BL2
		OR			
3		Discuss the operating principle, types and applications of thermal relays.	10M	CO1	BL2
4	a)	Draw and explain the characteristics of a MHO relay on an R-X diagram.	5M	CO2	BL2
	b)	Draw impedance, reactance and MHO characteristics to protect the 100 per cent of the line having (2.5 + j6) ohm impedance. A fault may occur at any point on the line through an arc resistance of 2 ohms. Determine the maximum percentage of line section which can be protected by each type of relay.	5M	CO2	BL3

OR

5		Justify with your answer why a reactance relay is preferred for the protection of short lines against both, phase faults as well as ground fault. Explain in detail.	10M	CO2	BL3
6	a)	What are the important operating principles which are used in wire pilot schemes? Discuss the Transley scheme of wire pilot protection.	5M	CO3	BL2
	b)	Define frame leakage protection. Discuss its working principle and field of application.	5M	CO3	BL2

OR

7		Generalize the various types of faults encountered in transformers.	10M	CO3	BL2
8	a)	Distinguish between Over current relays and Directional relays.	5M	CO4	BL2
	b)	Briefly discuss how an amplitude comparator can be converted to a phase comparator and vice versa.	5M	CO4	BL2

OR

9		Summarize how an elliptical characteristic is realised using static comparators. Why is an elliptical characteristic used only for back-up protection?	10M	CO4	BL3
10	a)	Describe the construction and operation of the HRC cartridge fuse. What are its advantages and disadvantages?	5M	CO5	BL2
	b)	Explain the points to he considered while selecting a fuse.	5M	CO5	BL2

OR

11		Illustrate the operating principle of SF_6 circuit breaker. What are its advantages over other types of circuit breakers? For what voltage range is it recommended.	10M	CO5	BL3

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