

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:3170908****Date:03-01-2023****Subject Name:Switchgear And Protection****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
<b>Q.1</b>	(a) Explain zones of protection. Why adjacent zones are overlapped?	<b>03</b>
	(b) Explain DMT and IDMT over current relay.	<b>04</b>
	(c) What are the essential quantities of protective relaying? Explain them.	<b>07</b>
<b>Q.2</b>	(a) Explain the concept of current discrimination for the protection of radial feeder.	<b>03</b>
	(b) Draw a neat diagram of induction cup type relay and explain its operating principle.	<b>04</b>
	(c) Draw the block diagram of a numerical relay and explain it.	<b>07</b>
	<b>OR</b>	
	(c) Explain TSM and PSM for IDMT relays. How relay operating time is calculated?	<b>07</b>
<b>Q.3</b>	(a) State advantages and applications of distance relay.	<b>03</b>
	(b) Explain MHO relay with its characteristics on R-X diagram	<b>04</b>
	(c) Explain 3 stepped distance protection.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Explain in brief, how the percentage differential relay overcomes the drawbacks of simple differential relay.	<b>03</b>
	(b) Explain harmonic restrain relay.	<b>04</b>
	(c) Explain the construction and working of Buchholz relay.	<b>07</b>
<b>Q.4</b>	(a) Explain possible busbar faults.	<b>03</b>
	(b) Explain with a neat diagram frame leakage protection of busbar.	<b>04</b>
	(c) Draw and explain Merz Price Protection of alternator stator winding. State its advantages.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Explain induction motor protection against single phasing.	<b>03</b>
	(b) Explain the negative sequence protection of alternator.	<b>04</b>
	(c) List and explain the various abnormal operation conditions against which a large induction motor has to be protected.	<b>07</b>
<b>Q.5</b>	(a) Discuss the difference between the measuring CT and protecting CT.	<b>03</b>
	(b) Define the following terms related to current transformer.	<b>04</b>
	i) Rated primary current	
	ii) Rated short time primary current	
	iii) Burden	
	iv) Ratio error	
	(c) Explain recovery rate theory and energy balance theory of arc interruption in AC circuit breaker.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Explain advantages and disadvantages of air blast circuit breaker?	<b>03</b>

- (b) Write a technical note on: Dielectric properties of SF<sub>6</sub> gas.
- (c) Write a technical note on: Minimum Oil Circuit breaker

**04**

**07**

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