Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree 7th semester (S,FE) Exam April 2025 (2019 Scheme)

Course Code: EET473

Course Name: DIGITAL PROTECTION OF POWER SYSTEMS

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks.

			Marks
1		What are the disadvantages of current differential relay?	(3)
2		Explain the operating principle and characteristics of reactance relay.	(3)
3		List different faults occurs in bus-bar.	(3)
4		What are the different methods of fault detection using travelling waves?	(3)
5		Describe the purpose of surge protection circuit in numerical relay.	(3)
6		Explain about signal aliasing error?	(3)
7		What is the key difference between FIR and IIR filter?	(3)
8		Why digital filtering is required in a digital relay?	(3)
9		Describe the concept of deterministic decision making in protective relaying.	(3)
10		Discuss about adaptive relaying.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Explain the zones of protection in power system with the help of neat schematic diagram.	(7)
	b)	Explain the working of Magneto Optic CT with neat schematic diagram. Also, write down its advantages.	(7)

OR

12	a)	Explain the working of Capacitive Voltage Transformers with neat schematic diagram.	(8)
	b)	A relay with a rating of 5A is connected through a current transformer (CT) with a current ratio of 400/5. If a fault current of 1600A flows in the circuit, determine the time of operation of the relay if it has a setting of 125% and a TSM of 0.6.	(6)

Module II

13	a)	Discuss about three zone distance protection in transmission line.	(8)
	b)	With a neat diagram, explain Translay differential pilot wire protection scheme.	(6)

OR

14	a)	Discuss about restricted earth fault protection of a generator with a neat diagram.	(8)

	b)	Explain the loss of excitation protection for a generator.	(6)

Module III

15	a)	With a block diagram, explain the components of a numerical relay. Also mention the advantages of numerical relays.	(10)
	b)	Explain the operation of a sample and hold circuit.	(4)

OR

16	a)	Explain the signal conditioning subsystem in numerical relays.	(9)
	b)	Explain the communication in protective relays based on IEC61850.	(5)

Module IV

17	a)	Derive the basic formulation of sample and first derivative method in sinusoidal wave-based algorithm.	(7)
	b)	Explain how the impedance to the fault is found by using Least square method.	(7)

OR

18	a)	Explain the full cycle window algorithm.	(8)
	b)	Give a comparison between infinite impulse filter and finite impulse filter.	(6)

Module V

19	a)	Explain adaptive differential protection scheme.	(7)
	b)	Discuss the methods of decision making with multiple criteria in protective relays.	(7)

OR

20	a)	Explain the architecture of wide area measurement unit with the help of a diagram.	(9)
	b)	Give the applications of phasor measurement unit.	(5)

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