Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (R, S) / S5 (PT) (R, S) Examination December 2023 (2019 Scheme)

Course Code: MET413

Course Name: ADVANCED METHODS IN NONDESTRUCTIVE TESTING

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

PART A

Answer all questions, each carries 3 marks. Marks

1		Explain the types of Visual Inspection?	(3)
2		Compare dry continuous method and wet residual method?	(3)
3		Explain the concept of critical angles?	(3)
4		What are the types of ultrasonic search units?	(3)
5		Explain the structure of radiation film?	(3)
6		Explain the concept of panoramic Radiography?	(3)
7		Explain the concept of calibration of TOFD?	(3)
8		Explain the concept of beam steering in phased array inspection?	(3)
9		Explain the concept of computed tomography?	(3)
10		What is acoustic emission inspection, and how does it work?	(3)

PART B

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

Module I

11	a)	Explain the types of coil arrangements used in Eddy current inspection and compare them?	(7)
	b)	If a ring-shaped specimen is given for magnetic particle inspection, which magnetisation method will you choose for MPT? Justify your answer with a neat sketch?	(7)

OR

12	a)	What are the material attributes and environmental factors that affect visual testing? Explain?	(7)
	b)	With a neat sketch explain the working principle of eddy current testing?	(7)

Module II

13	a)	Explain the working principle of Laser Shearography with a neat sketch?	(9)
	b)	List any five applications of Laser shearography?	(5)

OR

14 a) Explain the working principle of EMAT with a neat sketch? (8)

b) What are ultrasonic guided waves, and how do they differ from conventional ultrasonic waves? (6)

Module III

15 a) Explain the working principle of intensifier tubes with a neat sketch? (8)

b) Explain the interpretation of radiographs in the context of fluoroscopy and real-time radioscopy. (6)

OR

16 a) Explain the working principle of neutron radiography with a neat sketch? (7)

b) What are the sources of radiation? Explain the methods to generate electromagnetic waves in radiographic inspection? (7)

Module IV

17 a) Explain the working principle of TOFD? (7)

b) Explain the working principle of synthetic aperture focusing technique? (7)

OR

18 a) What are the different types of probes used in phased array technique? List their characteristics? (6)

b) What is Structural Health Monitoring (SHM), and what are the different methods used in SHM? (8)

Module V

19 a) Explain the concept of leak testing and its importance in various industries.? (8)

b) What is digital radiography, and how does it differ from computed tomography (CT)? (6)

OR

20 a) What are the different thermographic non-destructive evaluation (NDE) methods? (8)

b) How are heat-sensitive paints and heat sensitive papers used in inspection? What are their advantages? (6)

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