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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Mechanical Engineering

Semester End Examination; August - 2023

Non-Destructive Testing

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Explain various NDT methods and their applications.
CO2:.Describe magnetic particle inspection and radiographic inspection.
CO3: Explain optical holography and Eddy current inspection methods.
CO4:.Analyze ultrasonic signals, eco and various material scanning methods.
CO5: Explain thermal inspection at acoustic emission inspection methods.

Note: ***I) PART - A*** *is compulsory.* ***Two*** *marks for each question.*
II) PART - B*: Answer any* ***Two*** *sub questions (from a, b, c) for a Maximum of* ***18 marks*** *from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
1 a.	Mention any two volumetric flaws induced in welding process.	2	L1	CO1	PO1
b.	What are the sources of neutrons in neutron radiography?	2	L1	CO2	PO1
c.	What is meant by skin effect in eddy current inspection?	2	L1	CO3	PO1
d.	Mention any two commonly used couplants in ultrasonic inspection.	2	L1	CO4	PO1
e.	Mention any two scientific applications for image processing.	2	L1	CO5	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
2 a.	With a neat sketch, explain the construction and functions of rigid bore scope with a light guide bundle in the shaft.	9	L2	CO1	PO1
b.	With necessary sketch, explain the principle of liquid penetrant inspection.	9	L2	CO1	PO1
c.	Discuss about the NDT methods for the detection of interior flaws with their relative advantages and disadvantages.	9	L2	CO1	PO1
	UNIT - II	**18**			
3 a.	With a process flow chart, explain the various steps involved in magnetic particle testing.	9	L2	CO2	PO1
b.	With necessary sketch, explain the Gamma-ray radiographic testing.	9	L2	CO2	PO1
c.	State the advantages, limitations, and applications of magnetic particle inspection.	9	L2	CO2	PO1

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	UNIT - III	**18**			
4 a.	With necessary sketch, explain the construction and working of holocamera used to record hologram of an object on a photographic plate.	9	L2	CO3	PO1
b.	With necessary sketch, explain the basic instruments involved in eddy current testing.	9	L2	CO3	PO1
c.	Write a note on Coil impedance and lift off factor in eddy current inspection.	9	L2	CO3	PO1
	UNIT - IV	**18**			
5 a.	With a sketch, explain pulse echo method of ultrasonic testing with its advantages and disadvantages.	9	L2	CO4	PO1
b.	Explain major variables in ultrasonic inspection.	9	L2	CO4	PO1
c.	Discuss about the applications of industrial computed tomography.	9	L2	CO4	PO1
	UNIT - V	**18**			
6 a.	With a sketch, explain the instrumentation of acoustic emission testing.	9	L2	CO5	PO1
b.	With a sketch, explain the basic principle of thermography testing. List its applications.	9	L2	CO5	PO1
c.	Illustrate the concept of image capture and acquisition system.	9	L3	CO5	PO1

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