QPC: RN18001218 AR - 18 Reg. No. | | | | | | | | | | |

GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, November – 2021

(Seventh Semester)

BMEPE7022 - NON DESTRUCTIVE EVALUATION AND TESTING

(Mechanical Engineering)

Time: 3 hrs Maximum: 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) (2 x 10 = 20 Marks)

Q.1. Answer ***ALL*** questions [CO#] [PO#]

a. Which of the following methods of NDT requires leak proofing of casting before inspection? [CO1] [PO1]

(i) Impact test (ii) Visual inspection

(iii) Sound test (iv) Pressure test

b. Which of the following defects occur due to flux employed and electrode coating? [CO1] [PO1]

(i) Inclusion of slag (ii)Inadequate penetration

iii) Incomplete fusion iv) Porosity

c. Which of the following defects occur when weld metal layer fails to fuse together? [CO1] [PO1]

(i) Inclusion of slag (ii)Inadequate penetration

iii) Incomplete fusion iv) Porosity

d. A hysteresis loop shows the relationship between the: [CO2] [PO1]

i)Induced magnetic flux density and the magnetizing force (ii) Induced magnetic flux density and the electron force

iii) Electron flow and magnetic field strength iv) All of these

e. A material with a wider hysteresis loop has? [CO2] [PO1]

(i) Higher reluctance (ii) Lower permeability

(iii) Higher permeability (iv) None of theses

f. Eddy current test is used to detect [CO3] [PO1]

(i)Cracks (ii)Conductivity

iii) Hardness iv) All of these

g. Ultrasonic vibrations are commonly used to [CO3] [PO1]

(i) Support findings after visual inspection. (ii) characterize grain structure.

(iii) detect discontinuities in multilayered structures having air gaps between layers (iv) Perform volumetric examinations of ferrous and nonferrous materials.

h. The number of X-ray or Gamma photons that are transmitted through a material depends on the [CO4] [PO1]

(i) Energy of the photons (ii) Thickness of the material

iii) Atomic number of the material (iv) All of these

i. Radiographic contrast describe: [CO4] [PO1]

(i) The sharpness of lines in a radiograph (ii) The differences in photographic density in a radiograph

iii) The average photographic density in a radiograph | iv) The difference in density between two different radiographs

j. Film contrast is determined by: [CO4] [PO1]

(i) The type of film used | (ii) The process by which the film was developed

(iii) The radiation energy used | (iv) Both (i) and (ii)

PART – B: (Short Answer Questions) (2 x 10 = 20 Marks)

Q.2. Answer ***ALL*** questions	[CO#]	[PO#]
a. Discuss the objectives of non-destructive testing.	[CO1]	[PO1]
b. Compare destructive testing and non-destructive testing.	[CO1]	[PO1]
c. Examine the factors affecting mechanical properties of materials.	[CO1]	[PO1]
d. Define the terms "Dwell time and Developing time".	[CO2]	[PO1]
e. Why should the material be demagnetized after it is subjected to NDT?	[CO2]	[PO1]
f. Describe piezo electric effect.	[CO3]	[PO1]
g. Describe variables influencing UT.	[CO3]	[PO1]
h. Define inverse square law in radiography.	[CO4]	[PO1]
i. Summarize the properties of X rays and Gamma rays.	[CO4]	[PO1]
j. Describe about intensifying screens.	[CO4]	[PO1]

PART – C: (Long Answer Questions) (15 x 4 = 60 Marks)

Answer ***ALL*** questions	Marks	[CO#]	[PO#]
3. a. Differentiate between destructive and non-destructive testing.	10	[CO1]	[PO1]
b. Summarize about the factors influencing the selection of NDT methods.	5	[CO1]	[PO1]
OR			
c. Illustrate about non - destructive testing methods and applications of each technique.	15	[CO1]	[PO1]
4. a. Discuss about the physical principles of liquid penetrant testing with neat sketch. Also bring out the advantages and limitations of the liquid penetrant testing.	10	[CO2]	[PO1]
b. List the types of penetrant.	5	[CO2]	[PO1]
OR			
c. Explain about various steps involved in Magnetic particle inspection process with suitable flow diagram.	15	[CO2]	[PO1]
5. a. Describe the principle of ultrasonic testing with suitable block diagram.	10	[CO3]	[PO1]
b. List the advantage and disadvantage of ultrasonic testing.	5	[CO3]	[PO1]
OR			
c. Illustrate with neat sketch about the following (i) A-scan (ii) B-scan iii) C-scan	15	[CO3]	[PO1]
6. a. Explain about the process of Neutron Radiography and Computed Tomography.	15	[CO4]	[PO1]
OR			
b. Illustrate the components of X-ray generator with suitable sketch.	15	[CO4]	[PO1]

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