

CS/B.TECH(ME/PE)/SEM-8/ME-824/2012

2012

**ADVANCED SENSORS FOR ENGINEERING
APPLICATIONS AND NDT**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words as
far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

$$10 \times 1 = 10$$

i) Dynamic change in a material can be detected by

- a) Magnetic particle testing
- b) Acoustic emission monitoring
- c) Eddy current testing
- d) None of these.

ii) An axial magnetic field can detect flaws

- a) Parallel to it b) at an angle to it
- c) both (a) & (b) d) none of these.

iii) Materials that can be inspected by magnetic particle
testing must be

- a) Ferromagnetic
- b) ferrous but non-ferromagnetic
- c) both (a) & (b)
- d) none of these.

iv) Radiations used for radiographic inspection are

- a) X-rays b) gamma rays
- c) neutron beams d) all of these.

v) Defects in porous objects cannot be detected by

- a) radiographic inspection
 - b) liquid penetrant method
 - c) ultrasonic inspection
 - d) all of these.
- vi) A pulse oscillator is needed in
- a) Strain testing
 - b) Resistivity method
 - c) Ultrasonic inspection
 - d) Radiographic inspection.
- vii) Photosensors can sense
- a) Light energy
 - b) Electromagnetic energy
 - c) Both (a) & (b)
 - d) none of these.
- viii) Thermographic inspection refers to imaging of the thermal patterns at the object's
- a) Surface b) Centre
 - c) Both (a) & (b) d) none of these.
- ix) Direction of eddy current with respect to the magnetizing current is
- a) opposite b) in the same direction
 - c) perpendicular d) none of these.
- x) Wettability of a liquid on a solid surface is best when the wetting angle is
- a) Greater than 90° b) Less than 90°
 - c) Equal to 90° d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What are the advantages and disadvantages of NDT ?
3. State different practical applications of NDT.

4. Describe in brief the dye penetrant testing method.
5. Write a short note on fibre optic sensors.
6. Describe how radiation is sensed by silicon sensors ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Describe the magnetic particle testing method. What are its advantages and limitations ? 11 + 4
8. Which type of defects are detected by eddy-current testing method and how ? Which are the necessary requirements of an eddy-current testing equipment ? 11 + 4
9. Discuss the flaw detection by ultrasonic inspection method. Describe briefly the pulse echo and through transmission techniques of ultrasonic inspection. 9 + 6
10. What do you mean by a sensor ? What is a smart sensor ? Name different types of smart sensors and their uses. What are its advantages ? 3 + 3 + 6 + 3
11. What is Hall effect ? Describe one Hall effect transducer. Mention some of its applications. 5 + 8 + 2
12. Discuss radiographic inspection and acoustic emission methods. 8 + 7

=====