

**CS/B.Tech (ME/PE)/SEM-8/ME-824/2013**

**2013**

**ADVANCED SENSORS FOR  
ENGINEERING APPLICATION 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 any ten of the  
following : 10x1 = 10

i) Magnetic particle testing can detect

a) surface flaws b) sub-surface flaws

c) both (a) & (b) d) none of these.

ii) Eddy current testing method is applicable to

a) Ferrous metals b) Non-ferrous metals

c) Both (a) & (b) d) None of these.

iii) Developer is used in die penetrant test to

a) clean the surface

b) draw the traces of penetrants

c) both (a) & (b)

d) none of these.

iv) Most commonly used NDT is

a) Ultrasonic testing

b) Die penetrant testing

c) Visual inspection

d) None of these.

v) Eddy current testing method is sensible to

a) Surface defects b) Sub-surface flaws

- c) Both (a) & (b) d) None of these.
- vi) Optical pyrometer is used to measure
  - a) light intensity
  - b) flow temperature
  - c) high temperature
  - d) light intensity and high temperature.
- vii) Electromagnetic flow meter must be
  - a) mounted vertically
  - b) mounted horizontally
  - c) rotated at constant speed to develop proper *emf*
  - d) can be mounted in any position.
- viii) Radiations used for radiographic inspection are
  - a) X-rays b) Gamma rays
  - c) Neutron beams d) All of these.
- ix) Ultrasonic wave emitting capacity of air is
  - a) good b) poor
  - c) medium d) none of these.
- x) Acoustic emission monitoring can detect only
  - a) static flaws b) growing flaws
  - c) any of these d) none of these.
- xi) Loudness level is the sound power level at
  - a) low frequency of 100 Hz
  - b) frequency of 1000 Hz
  - c) high frequency of 10000 Hz
  - d) none of these.

### **GROUP – B**

#### **( Short Answer Type Questions )**

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

2. What is non-destructive testing ? Compare NDT with DT methods. 1 + 4

3. How can acoustic emission method be used to determine the location of a flaw ?
4. Describe how silicon sensors can be used to sense radiation.
5. Write a short note on optical fibre.
6. Briefly explain liquid penetrating technique to determine the location of surface cracks.

### **GROUP – C**

#### **( Long Answer Type Questions )**

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

7. Explain the advantages and disadvantages of ultrasonic testing method. Briefly describe the three types of ultrasonic inspection method.  $3 + 12$
8. a) Write the advantages and disadvantages of NDT method.  
b) How can radiographic inspection be used to detect flaws in an object ? What are the limitations of radiographic testing ?  $6 + 2 + 7$
9. a) Write the principle of magnetic particle testing. What is the primary material related limitation of magnetic particle testing ?  
b) Describe how the orientation of a flaw with respect to a magnetic field can affect its detectability during magnetic particle inspection.  $5 + 2 + 8$
10. a) What is Hall effect transducer ? Define 'Hall coefficient'.  
b) How can thermographic inspection be used to reveal defects ?  $3 + 3 + 9$
11. Write short notes on the following :  $3 \cdot 5$ 
  - a) Planner technology
  - b) Borescope
  - c) Visual inspection testing.