

### MCQ's Unit-6: Nano technology and NDT

Q.1 The colour of the nano gold particles is

- A Yellow
- B Orange
- C Red
- D Variable

Ans D

Q.2 When semiconductors are reduced to nanometres they become

- A Pure conductor
- B Insulator
- C Semiconductor but with higher band gap energy or insulator
- D Semiconductor but with lower band gap energy

Ans C

Q.3 Quantum dots can be used in

- A Crystallography
- B Optoelectronics
- C Mechanics
- D None of the above

Ans B

Q.4 The properties like melting point, solubility, color, etc changes on varying the

- A Size
- B Composition
- C Surface properties
- D None of the mentioned

Ans D

Q.5 Quantum confinement results in

- A Energy gap in semiconductor is proportional to the inverse of the square root of the size
- B Energy gap in semiconductor is proportional to the inverse of the size
- C Energy gap in semiconductor is proportional to the square of size
- D Energy gap in semiconductor is proportional to the inverse of the square of size

Ans D

Q.6 Which of the following is the principal factor which causes the properties of nanomaterials to differ significantly from other materials?

- A Size distribution
- B Specific surface feature
- C Quantum size effects
- D All of the mentioned

Ans A

Q.7 10 nm= \_\_\_\_\_ m

- A  $10^{-9}$
- B  $10^{-11}$
- C  $10^{-8}$
- D  $10^{-3}$

Ans C

Q.8 Generally, the size of nanoparticles is between \_\_\_\_\_ nm

- A 100 to 1000
- B 0.1 to 10
- C 1 to 100
- D 0.01 to 1

Ans C

Q.9 Band gap energy of semiconductor ..... with decrease in the size to the nanometer.

- A Increases
- B Decreases
- C Remains same
- D None of the above

Ans A

Q.10 Mechanical strength of material ..... with decrease in the size to nanometer.

- A Increases
- B Decreases
- C Remains same
- D None of the above

Ans A

Q.11 Normal ferromagnetic material will become ..... after reduction in the size to nanometer.

- A Diamagnetic
- B Remains ferromagnetic
- C Super paramagnetic
- D Non-magnetic

Ans C

Q.12 The nano-particles which has band gap in the UV region are used in.....

- A TV screen
- B Laser Printer
- C Sun screen lotion
- D Solar cell

Ans C

Q.13 On decreasing the size the electron gets confined to the particle (confinement effects) leading to:

- A increase in band gap energy
- B band levels get quantized (discrete)
- C decrease in band gap energy
- D Both a and b is true

Ans D

Q.14 The energy level spacing ..... with decreasing dimension

- A Increases
- B Decreases
- C Some time increases and some time decreases
- D Remains same

Ans A

Q.15 The color of metallic nano particles depends on ..... in the nano scale regime

- A Size
- B Electric conductivity
- C Thermal conductivity
- D Mechanical strength

Ans A

Q.16 Which of the following is the principal factor which causes the properties of nanomaterials to differ significantly from other materials?

- A Size distribution
- B Specific surface feature
- C Specific surface feature
- D All of these

Ans D

Q.17 For nanostructures, increase in strength has been observed by decreasing \_\_\_\_\_.

- A Diameter of micro-wires under torsion
- B Thickness of thin films under bending or uniaxial tension
- C Void size in Nano porous media
- D All of these

Ans D

Q.18 Physical properties of nanomaterials are related to

- A Large fraction of surface atoms
- B High surface energy
- C Reduced imperfections
- D All of these

Ans D

Q.19 A material with one dimension in Nano range and the other two dimensions are large is called \_\_\_\_\_

- A Micro-material
- B Quantum wire
- C Quantum well
- D Quantum dot

Ans C

Q.20 The first talk about nano-technology was given by \_\_\_\_\_

- A Albert Einstein
- B Newton
- C Gordon E. Moore
- D Richard Feynman

Ans D

Q.21 Targeted drug delivery involves-

- A Delivering a drug directly to the diseased part of the body
- B Delivering a drug from the factory to the targeted population
- C Making more drug available to the affected population
- D None of the above

Ans A

Q.22 Nanoparticles have..... surface area per unit mass.

- A Small
- B Large
- C Very small
- D None of these

Ans B

Q.23 Ohms law for bulk metal and nano wire.....

- A same
- B different
- C is straight line and staircase type respectively
- D is staircase type and straight line respectively

Ans C

Q.24 One dimensional nano materials are also known as

- A Quantum wire
- B Quantum dot
- C Thin film
- D None of these

Ans A

Q.25 In which type of test the capillary action principle is used?

- A Probe test
- B Bend liquid test
- C Dye penetrant test
- D None of the above

Ans C

Q.26 Non-destructive testing is used to determine

- A location of defects
- B chemical composition
- C corrosion of metal
- D All of these

Ans D

Q.27 Which among the following is not a type of Non-destructive testing?

- A compression test
- B visual testing
- C ultrasonic testing
- D eddy current testing

Ans A

Q.28 Identify the type of destructive testing

- A Radiographic test
- B Dye penetrate test
- C Creep test
- D All of the above

Ans C

Q.29 Which of the following statements is/are true for ultrasonic test?

- A Equipment used for ultrasonic testing is portable
- B Complicated shapes can be easily scanned
- C Waves generated are health hazardous
- D All the above statements are true

Ans A

Q.30 Which test is used to determine dimensions of any object?

- A Ultrasonic test
- B Torsion test
- C Eddy current test
- D All of these tests can be used to determine dimensions of any object

Ans A

Q.31 The NDT methods are commonly used to detect the defect/discontinuities on surface weld:

- A Visual Testing (VT)
- B Penetrant Testing (PT)
- C Eddy Current Testing (ET)
- D All of these

Ans D

Q.32 For detection of internal weld defects or discontinuities, material what are the NDT methods commonly used?

- A Penetrant Testing (PT)
- B Radiographic Testing (RT)
- C Ultrasonic Testing (UT)
- D Both B and C

Ans D

Q.33 Radiography Testing like X-rays or  $\gamma$ -rays is used to detect

- A Cracks
- B Cavities
- C Flaws
- D all of the above

Ans D

Q.34 Which one of the following conditions will affect the rate and the extent a liquid penetrant will enter cracks, fissures, and other small openings?

- A the hardness of the specimen being tested
- B the surface condition of the specimen being tested
- C the color of the penetrant
- D the conductivity of the specimen being tested

Ans B

Q.35 Which of the following is a commonly used classification for penetrant?

- A post-emulsifiable penetrant
- B nonferrous penetrant
- C chemical etch penetrant
- D nonaqueous penetrant

Ans A

Q.36 Liquid penetrant testing is capable of detecting:

- A intergranular stress corrosion cracking discontinuities

- B discontinuities open to the surface
- C subsurface discontinuities
- D all of the above

Ans B

Q.37 A term used in ultrasonic to express the rate at which sound wave pass through various substances is:

- A frequency
- B velocity
- C wavelength
- D pulse length

Ans B

Q.38 When testing a plate, increasing the frequency of an ultrasonic longitudinal wave results in:

- A an increase in its velocity
- B a decrease in its velocity
- C no change in its velocity
- D a reversal in its velocity

Ans C

Q.39 Most commercial ultrasonic testing is accomplished using frequencies between:

- A 1 and 25 kHz
- B 1 and 1 000 kHz
- C 0.2 and 25 MHz
- D 15 and 100 MHz

Ans C

Q.40 "Magnetic particle" is a nondestructive examination method used for:

- A locating surface discontinuities
- B locating near surface discontinuities
- C both a and b
- D detecting material separation

Ans C

Q.41 Magnetic particles available in different colors because

- A for color contrast with the part surface
- B to enhance the detection of indications
- C both a and b
- D different colors are used with different magnetic flux values

Ans C

Q.42 A part is adaptable to magnetic particle inspection if:

- A it is attached to an electrostatic field
- B the material is ferromagnetic
- C the material is nonferrous
- D the material is an electric conductor

Ans B

Q.43 Which of the following is an advantage of magnetic particle testing over penetrant testing?

- A it can detect surface discontinuities with foreign material imbedded in them
- B it is faster on individual parts
- C it can detect near-surface discontinuities
- D all of the above

Ans D

Q.44 Inspecting a part by magnetizing, removing the current flow, and then applying the medium is called the:

- A continuous method
- B wet method
- C residual method
- D dry method

Ans C

Q.45 In acoustic emission technique pressure is applied using.....to generate stress waves.

- A Abrupt Mechanical load
- B Abrupt temperature change
- C Both a and b
- D None of these

Ans C

Q.46 In ultrasonic testing thickness of the film is calculated using the simple mathematical relationship

- A  $T = (V) \times (t/2)$
- B  $T = (V) \times (2t/2)$
- C  $T = (2V) \times (t)$
- D  $T = (V) \times (t/4)$

Ans A

Q.47 An ultrasonic pulse is sent through a metal block of 5 cm thick and echo is recorded after 1.2  $\mu$ s from the flaw. If velocity of ultrasonic wave in that metal is 4900 m/s, then flow is located at .....cm from top surface

- A 1
- B 0
- C 2.94



D 10

Ans C

Q.48 What is a non-destructive test?

- A A test that destroys the material being tested
- B A test that does not destroy the material being tested
- C A test that is not useful in measuring destructive properties
- D A test that does not cause an explosion

Ans B

Q.49 Identify the type of non-destructive testing

- A Radiographic test
- B Dye penetrant test
- C Creep test
- D Both a and b

Ans D

Q.50 Which of the following types of rays is used in radiography for the inspection of castings?

- A X- rays
- B Infrared rays
- C Ultraviolet rays
- D Visible rays

Ans A