



**Answer the following questions**

**Question no. 1 (Answer by True or False, and correct the false answer)**

1. Magnetic particles inspection is applicable for any materials.
2. In magnetic particles inspection, dry particles are carried in air or gas suspension while wet particles are carried in only gas suspension.
3. Surface plating or thin paint coating affect the sensitivity of the magnetic particles test.
4. Sub-surface cracks can be easily detected by magnetic particles inspection.
5. Almost any shaped and sized component can be tested for defects by Magnetic particles inspection.
6. Strong indications of defects with a high sensitivity can be obtained when the magnetic particles are composed of a blend with some of spheroidal form and some possessing an elongated shape.
7. The three main types of penetrant systems currently in use are water washable systems, post-emulsification systems, and solvent system.
8. The eddy current method can inspect components of complex shapes.
9. The radiograph used for non-destructive testing purposes poses a major health risk to any operators or nearby individuals due to the amount of radiation emitted from the device.
10. X-ray equipment is relatively expensive, especially when using X-ray sources.
11. The LP inspection method is recommended to detect small and shallow surface cracks.
12. Radiographic techniques are unable to consistently detect many surface and internal discontinuities without much preparation before analysis.
13. The inspection process using the X-ray test technique is relatively fast.
14. LP method used to check the level of liquid in sealed liquid-filled systems.
15. Radiographic technique is expensive and can detected all cracks.
16. Neutron imaging can only be done with a nuclear reactor.
17. Neutron imaging can be used in field work.
18. The prosses of neutron radiography involves transmission of neutrons through a component or assembly and production radiograph on film.
19. Eddy currents are created through a process called electromagnetic induction.
20. For eddy current inspection, the inspected area should be clean, smooth, free from any irregular or uneven paint.
21. Wet magnetic particles inspection is recommended if the surface of inspected component is slightly rough and free from oils and greases.
22. Wet particles inspection tends to be more sensitive than wet particle for the indication of sub-surface defects.
23. Ultrasonic Testing uses a high frequency sound energy to conduct examinations and make measurements.
24. After magnetic particles testing, demagnetization is a must.
25. Magnetic particle inspection is very simple and fast traditional NDT method because of its convenience and low cost.

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26. Magnetic particle inspection method uses electromagnet yoke and small magnetic particles, such as iron filling to detect flaws in components.
27. The depth of the defect can be detected by normal probe reflection technique.
28. High ultrasonic frequencies are suitable for fine-grained wrought materials.
29. Defects within butt welds can be detected by angle probe transmission method.
30. Ultrasonic testing can detect surface and sub-surface discontinuities.
31. A record can be made by 'A' scan display in UT method.
32. Normal probe transmission method needs an access to only one side of the test piece.
33. Radial defects in cylindrical tubes can be detected by normal probe.
34. One of the tasks of the optical inspection probe is to reach parts that are difficult to reach without damaging them.
35. One of the advantages of the optical inspection probe is that it has different diameters.
36. The optical inspection probe is composed of three main parts, namely, the lens head, a lighting system and a screen to display the image.
37. In a TOFD test, when a crack is present, there is a diffraction of the ultrasonic wave from the tip(s) of the crack.
38. In a TOFD system, a pair of ultrasonic probes sits on opposite sides of a weld. One of the probes is a transmitter, which emits an ultrasonic pulse that is picked up by the probe on the other side, which is a receiver.
39. Limitations of TOFD includes overlapping of signals, caused by dense shrinkage cavities, possibly present in castings, disables accurate sizing.
40. The greater length of the optical inspection probe does not affect the image quality.
41. The technique of eddy current testing is based on electromagnetic induction for inspection defects.
42. Eddy current testing is recognized as being fast, simple, and accurate.
43. The EDT provide information about structural features, such as crystal grain size and heat treatment condition.
44. The magnetic field of eddy currents is perpendicular to the magnetic flux.
45. The flaw or cracks lead to changes in the flow of eddy currents.
46. The factors which affect the eddy currents include conductivity, permeability, frequency, and proximity, geometry, probe handling, and discontinuities.
47. It is well known that the amplitude of eddy current (EC) density decreases with increasing depth, which is referred to as skin effect.
48. Eddy currents does not need to reference standards for setup.
49. During eddy current testing, the depth of penetration is not limited.
50. When a flowing continuous current pass through a coil generates a changing magnetic field.

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**Question no. 2 (choose the best answer)**

1. In which type of NDT test, the capillary action principle is used?  
 ( a. Probe test      b. Bend liquid test      c. Dye penetrant test      d. None of the above)
2. Non-destructive testing is used to determine  
 (a. location of defects      b. chemical composition      c. corrosion of metal      d. All of these)
3. Which among the following is not a type of Non-destructive testing?  
 (a. creep test      b. visual testing      c. ultrasonic testing      d. eddy current testing)
4. Which among the following is the last step in magnetic particle test method?  
 (a. observation and inspection      b. demagnetization      c. circular magnetization      d. magnetization)
5. 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)
6. During radiography test, which region absorbs less radiation and transmits more?  
 (a Low density region      b. Low and high density regions absorb and transmit same amount of radiation  
 c. High density region      d. None of the above)
7. Which test is used to determine thick and thin thickness of any object?  
 (a. Ultrasonic test      b. Torsion test      c. Eddy current test      d. All of these tests)
8. Neutron imaging is more useful than X-ray imaging for  
 (a. Detecting internal flaws in cast parts      b. Identifying bonding flaws in adhesives  
 c. Detecting and identifying the positions of o-rings, seals, lubricants, and adhesives inside complex assemblies  
 d. All previous answers)
9. Neutrons, unlike X-rays, are better for penetrating  
 (a. Light materials      b. Dense materials      c. Water      d. Plastics )
10. Neutron radiation interacts most strongly with  
 (a. The electron cloud      b. The atomic nucleus      c. Photons      d. Other neutrons)
11. Neutron radiation is produced by  
 (a. Fission of uranium with deuterium      b. Fusion of deuterium with tritium      c. Fusion of deuterium with deuterium  
 d. All of the above)
12. The piezoelectric material in a transducer that vibrates to produce ultrasonic waves is called:  
 (a. Backing material      b. Plastic wedge      c. Crystal      d. Couplant)
13. When an ultrasonic beam passes through the interface between two dissimilar materials at an angle, a new angle of sound travel takes place in the second material due to:  
 (a. Attenuation      b. Compression      c. Refraction      d. Reflection)
14. The velocity of sound in a material is dependent upon the:  
 (a. Frequency of the wave      b. Wavelength      c. Material properties      d. Vibration cycle)
15. When a 'C' scan recording is used to produce a permanent record of an ultrasonic test, the information displayed is typically the discontinuity's:

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- (a. Depth and size   b. Depth, orientation, and size   c. Location and depth   d. Location and size)
16. A test method in which the parts to be inspected are placed in a water bath or some other liquid couplant is called:  
 (a. contact testing   b. immersion testing   c. surface wave testing   d. through-transmission testing)
17. In a material with a given velocity, when frequency is increased, the wavelength will:  
 (a. not be affected   b. decrease   c. increase   d. Double)
18. The phenomenon whereby an ultrasonic wave changes direction when the wave crosses a boundary between materials with different velocities is called:  
 (a. reflection   b. refraction   c. penetration   d. Rarefaction)
19. The depth of a discontinuity cannot be determined when using the:  
 (a. straight beam testing method   b. transmission testing method   c. angle beam testing method   d. immersion testing method)
20. A piezoelectric material can:  
 (a. convert a longitudinal beam to a shear wave   b. convert a mechanical energy to electrical energy   c. create ionization in a test specimen   d. produce sound waves in a coaxial cable)
21. Advantages of TOFD include:  
 (a. good reliability and reproducibility of inspection available   b. accurate sizing of tips of defects   c. allowing quick reference and comparison   d. All previous)
22. Lead screens improve mainly the \_\_\_\_\_ of the final radiograph.  
 (a. Density   b. Contrast   c. Exposure   d. Definition)
23. In radiograph test, if we were to maintain the same exposure but decrease the source to film distance, we must \_\_\_\_\_ the time of exposure.  
 (a. Increase   b. Decrease)
24. Compared to the echo returned from a smooth reflector, the echo returned from a natural flaw of the same area and orientation is:  
 (a. The same   b. Greater   c. Smaller   d. Not related to)
25. In a basic pulse-echo ultrasonic instrument, the component that produces the time base line is called  
 (a. Synchroniser   b. Receiver   c. Sweep circuit   d. Pulser)

### Question no. 3

1. What is the meaning of NDT, and its importance, and applications?
2. Why iron, nickel, cobalt, or some of their alloys, are recommended materials for inspection in magnetic particles inspection method?
3. State some defects that can be detected by Visual Inspection?
4. State the advantages and disadvantages of Liquid Penetrant Inspection (LPI).
5. State and explain (only by sketch) the Principals/stages of LPI.
6. State and define the two basic solvent types?

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