

CBIP Examination Paper - UT thickness testing

Level 2 General

- 1 The only significant sound wave mode that will travel through a liquid is:
 - A. Shear (transverse)
 - B. Longitudinal (compression)
 - C. Surface
 - D. none of the above
- 2 Which of the following modes of vibration has the highest velocity in a given material?
 - A. Longitudinal wave
 - B. Shear wave
 - C. Surface wave
 - D. The wave with the highest frequency
- 3 Ultrasonic wave velocity in a given material is
 - A. Constant for a given wave mode
 - B. Equal to frequency x wavelength
 - C. Different for different wave modes
 - D. All of the above
- 4 Rayleigh waves are influenced most by defects located:
 - A. One wavelength below the surface.
 - B. Six wavelengths below the surface.
 - C. Close to or on the surface.
 - D. Three wavelengths below the surface.
- 5 The velocity of sound waves is dependent on:
 - A. The pulse length
 - B. The frequency
 - C. The material in which the sound is being transmitted and the mode of vibration
 - D. None of the above
- 6 Calculate the velocity of a wave with a frequency of 3.0 MHz and a wavelength of 1.2mm
 - A. 2500 m/s
 - B. 3230 m/s
 - C. 3600 m/s
 - D. 5920 m/s
- 7 Acoustic velocities for any given wave mode are determined by:
 - A. Density
 - B. Elasticity
 - C. Both (a) and (b)
 - D. Acoustic Impedance

- 8 The frequency of a transducer is primarily a function of:
A. The pulse length
B. The thickness of the crystal
C. The P.R.F of the instrument
D. None of the above
- 9 The angle of reflection is:
A. Equal to the angle of incidence
B. Dependent on the couplant used
C. Equal to the angle of refraction
D. None of the above
- 10 Which of the following material characteristics may affect the acoustic attenuation in the material:
A. Grain size
B. Elastic modulus
C. Crystalline structure
D. All of the above
- 11 The shape of an ultrasonic beam located in the far zone can be considered as:
A. Cylindrical
B. Spherical
C. Pyramidal
D. Conical
- 12 The formula $\sin q_1 / V_1 = \sin q_2 / V_2$ is used to determine:
A. Refraction angles
B. Phase velocities.
C. Amount of reflected sound energy
D. Acoustic impedance.
- 13 The formula used to determine the angle of beam divergence of a quartz crystal is:
A. $\sin f = (\text{Diameter} \times 2) / 4 \times \text{wavelength}$
B. $\sin f = \text{Diameter} / (\text{frequency} \times \text{wavelength})$
C. $\sin f = \text{frequency} \times \text{wavelength}$
D. $\sin f = (1.22 \times \text{wavelength}) / \text{Diameter}$
- 14 The ability to resolve two discontinuities at different depths would be improved by:
A. Decreasing the frequency
B. Shortening the pulse duration
C. Increasing the amplitude of the initial pulse
D. None of the above
- 15 The length of the near zone is dependent upon which of the following?
A. The diameter of the transducer
B. The frequency of the transducer
C. The velocity of sound in the material
D. All of the above

- 16 A test method in which the ultrasonic sound is emitted by a transmitting search unit, transmitted through the test part and picked up by a second receiving search unit on the opposite boundary is called:
- A. Surface wave testing
 - B. Angle beam testing
 - C. Through-transmission testing
 - D. All of the above
- 17 A device added to the front of a contact transducer to match the curvature of a test specimen is called a:
- A. Sloped shoe
 - B. Frontal lens
 - C. Curved lens
 - D. Curved shoe
- 18 The process of adjusting the settings of an instrument to a reference standard is referred to as :
- A. Zeroing
 - B. Metrology
 - C. Distance-amplitude correction
 - D. Calibration.
- 19 A level 1 NDT technician may not:
- A. Select the test technique
 - B. Decide on compliance of the tested items
 - C. Supervise other level 1 technicians
 - D. All of the above
- 20 In ultrasonic testing, a liquid coupling medium between the crystal surface and the part surface is necessary:
- A. To minimise wear on the probe surface
 - B. Because an air interface would almost completely reflect the acoustic energy
 - C. Because the crystal will not vibrate if in contact with the part surface
 - D. To complete the electrical circuit between the part and the crystal