Physics

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QUIZ 2 SOLUTION

Thermal Physics and Wave

Question 1

Root mean square can be described by the following equation

$$P = \frac{1}{3}\rho\overline{c^2}$$

P = Pressure (Pa)

ρ = Density (kg/ m^{-3})

Question 1

Converting all the unit

P = 1 atm = 1 x 10^5 Pa

ρ = 0.0023 g cm^{-3} = 2.3 kg m^{-3}

Finding the root mean square

$$\sqrt{c^2} = \sqrt{\frac{3p}{\rho}} = \sqrt{\frac{3 \; x \; 1 \; x 10^5}{2.3}} = 1.304 \; x \; 10^5 \text{ m/s}$$

Question 2

- Thermal contact: There is a possibility that the transfer of thermal energy happening between the objects

- Vacuum: The transfer of thermal energy only happens in closed system and there is no heat transfer to the external surrounding

Question 2

- There is definite conclusion regarding the internal energy of the blocks
- No net heat transfer between the two blocks since the two blocks have the same temperature (Zeroth Law of Thermodynamics)
- No definite conclusion on the specific heat

Question 3

- Progressive wave: the wave that distributes energy to the surrounding, hence the wave's amplitude is reduced gradually

- Wavelength: 1 m (from the graph)

- Frequency: 1/T = 1/0.5 = 2 Hz

- Speed = distance travelled/time travelled

  = wavelength/period = 2 m/s

Question 3

Estimate the position of Point A and B relative to the X axis

A = 0.25 m, B = 1.75 m

Since the wave describe a sin function To determine the phase we can use the equation $x. \left(\frac{2\pi}{\lambda}\right)$

Phase at A = $0.25(\frac{2\pi}{1}) = 0.5\pi = 90^0$

Phase at B = $1.75(\frac{2\pi}{1}) = 3.5\pi = 630^0$ or equal to 270^0

Question 3

No energy loss, the graph will have constant magnitude and hence the graph will be equal to *sin* function. To find displacement we can use the equation $y = A\,sin(x\frac{2\pi}{\lambda})$

A = amplitude = 2 m

Displacement at A = 2 x sin (90^0) = 2 m

Displacement at B = 2 x sin (270^0) = -2 m

References

A level complete guide, Themis Publisher,
www.xtremepapers.com,
Physics MCQ with helps (topical).