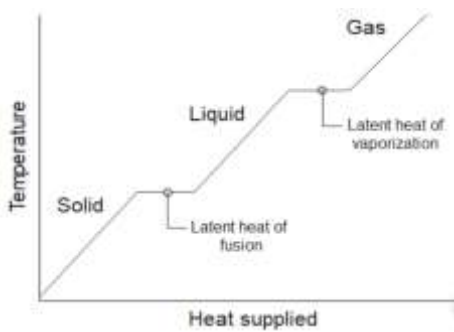


Directorate of Education, GNCT of Delhi
Suggestive answer key
Practice Paper – I
Class – XI
(Code: 042)

	खंड - अ SECTION - A
प्र. स. Q. No.	
Q1.	Iron is more elastic because the more the young's modulus more the elasticity. Since Young's modulus = Stress/Strain i.e. Deformation(strain) is less in iron as compared to rubber hence young modulus is greater in iron thus more elastic.
Q2.	Correct statement of Pascal's law Names of any two applications OR Correct statement of Stoke's law Names of any two applications of Stoke's law
Q3.	Correct definition of latent heat 
	खंड - ब SECTION - B
Q4.	a. Adiabatic process b. Isothermal process c. First law of thermodynamics
Q5.	a) At zero kelvin b) Rectangular hyperbola c) We know that $P = \frac{1}{3} \rho v^2$ $= \frac{1}{3} \left(\frac{M}{V} \right) v^2$

	But $v^2 \propto T$ $\therefore P \propto MT/V$ As both T and V remain unchanged but mass M is doubled, so the pressure of mixture gets doubled, i.e., it is equal to 2P. So pressure of mixed gases get doubled.
Q6.	a) Derivation of formula with figure and steps. b) The time period of a simple pendulum is $T=2\pi \sqrt{L/g}$ where L is the length of the pendulum. or $L= gT^2 / 4\pi^2$ The time period of the simple pendulum which ticks seconds is 2s. $\therefore T=2s$ Substituting in (i), we get $L= (9.8)(2)^2 / 4 \times (3.14)^2 = 0.992m \simeq 1m$
Q7.	a) Velocity of sound is directly proportional to square root of the temperature of the air. As temperature of warm air is more than temperature of cold air, velocity of sound is more in warm air than cold air. i) Frequency of the ultrasonic sound, $f=100 \text{ kHz}=10^5\text{Hz}$ Speed of sound in air, $V_a=340\text{m/s}$ The wavelength (λ_r) of the reflected sound is given by $\lambda_r = V_a / f$ $= 340 / 10^5$ $= 3.4 \times 10^{-3} \text{ m.}$ ii) Frequency of the ultrasonic sound, $f= 100 \text{ kHz} =10^5\text{Hz}$ Speed of sound in water, $V_w =1486 \text{ m/s}$ $\lambda_t = V_w / f$ The wavelength of the transmitted sound is given by $\lambda_t = 1486 / 10^5$ $= 1.49 \times 10^{-2} \text{ m.}$
Q8	Correct statement Labelled diagram with proof Limitations OR As velocity increases viscous force ($f_v=6\pi\eta Rv$) also increases and a point comes when viscous force become equal to gravitational force (mg) . At this

point there is no net force acting on the body due to opposite direction of the two forces. Hence velocity of the object stops increasing. This highest velocity which object has attained is called terminal velocity.

Derivation of an expression for terminal velocity.

Q9 Correct definition of triple point of water.
The triple point of water is a unique temperature and does not change with pressure and other external factors. The melting point and boiling point of water vary with pressure. That is, there is no fixed melting and boiling point of water.

Q10 The frequency of external periodic force is different from the natural frequency of the oscillator in case of forced oscillation but in resonance two frequencies are equal.

2) Since $x = A \cos (\omega t + \theta)$

Velocity, $v = dx/dt = -A \omega \sin(\omega t + \theta)$

At $t=0$, $x = x_0$

$x_0 = A \cos \theta \dots(i)$

and, $dx/dt = -v_0 = A \omega \sin \theta$

$A \sin \theta = v_0/\omega \dots(ii)$

Squaring and adding equations (i) and (ii), we get:

$A^2(\cos^2\theta + \sin^2\theta) = x_0^2 + (v_0^2 / \omega^2)$

$\therefore A = [x_0^2 + (v_0^2 / \omega^2)]^{1/2}$

Q11. 1) Only (ii) represents S.H.M . For SHM, acceleration should be directly proportional to displacement and sign should be negative. Hence, (ii) represents SHM.

2) The amplitude is $A = 1/2 \text{ m} = 0.5\text{m}$.

maximum velocity is given by

$V_{\max} = \omega A = 200 \times 0.5 = \mathbf{100 \text{ m/min}}$

OR

Let original freq. of sitar string A be n_a and original freq. of sitar string B be n_b

As number of beats / sec. = 6

$\therefore n_b = n_a \pm 6$

$$=324\pm6$$

$$=330\text{or}318\text{Hz}$$

When tension in A is reduced, its frequency reduces ($\because n \propto \sqrt{T}$)

As number of beats / sec decreases to 3 therefore, frequency
of B = $324 - 6 = \mathbf{318\text{Hz}}$

खंड - स
SECTION - C

Q12

- a) (i)
- b) (ii)
- c) (i)
- d) (ii)
- e) (i)