

- (x) The instantaneous velocity of mass spring system is _____.
- A. $v = v_0 \sqrt{1 - \frac{x^2}{x_0^2}}$ B. $v = v_0 \sqrt{1 - \frac{x_0^2}{x^2}}$
- C. $v = x_0 \sqrt{1 - \frac{x^2}{x_0^2}}$ D. $v = \frac{k}{m} \sqrt{1 - \frac{x^2}{x_0^2}}$
- (xi) If a pipe is closed at one end and open at the other, the fundamental note produced by it is _____.
- A. $f_1 = \frac{v}{4l}$ B. $f_1 = \frac{v}{2l}$ C. $f_1 = \frac{2l}{v}$ D. None of these
- (xii) Colours seen on oily water surface are due to the _____.
- A. Interference of light B. Diffraction of light
- C. Polarization of light D. Refraction of light
- (xiii) The technique used to study the structure of haemoglobin is _____.
- A. X-rays diffraction B. Newton's rings
- C. Polarization D. Interference
- (xiv) The near point of normal human eye is _____.
- A. 25 m B. 250 mm C. 2.5 cm D. None of these
- (xv) The speed of light in vacuum is _____.
- A. $3 \times 10^8 \text{ cm/sec}$ B. $3 \times 10^{10} \text{ cm/sec}$
- C. $3 \times 10^9 \text{ m/sec}$ D. None of these
- (xvi) The relationship between absolute temperature of an ideal gas and average translational kinetic energy is _____.
- A. $T = \frac{2}{3k} \left\langle \frac{1}{2} mv^2 \right\rangle$ B. $T = \frac{3}{2k} \left\langle \frac{1}{2} mv^2 \right\rangle$
- C. $T = \frac{2k}{3} \left\langle \frac{1}{2} mv^2 \right\rangle$ D. $T = \frac{3k}{2} \left\langle \frac{1}{2} mv^2 \right\rangle$
- (xvii) The cloud formation in atmosphere is an example of _____.
- A. Isothermal Process B. Adiabatic Process
- C. Isobaric Process D. Isochoric Process

For Examiner's use only:

Total Marks:

17

Marks Obtained:

— 1HA 1408 (L) —



PHYSICS HSSC-I

18

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Sections B and C comprise pages 1-2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 42)

Q. 2 Answer any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. (14 x 3 = 42)

- (i) Show that the expression $f = \frac{1}{2l} \sqrt{\frac{F \times l}{m}}$ is dimensionally correct, when 'f' is the frequency of vibrations on stretched string of tension 'F', length 'l' and mass 'm'.
- (ii) Why is it easier to open a tightened nut with a long spanner?
- (iii) What is the unit vector in the direction of vector $A = 4\hat{i} + 3\hat{j}$?
- (iv) A projectile is thrown with initial velocity 19.6m / sec at an angle 30° with the horizontal. How much time it will take to reach the maximum height?
- (v) A girl drops a cup from a certain height, which breaks into pieces. What are the energy changes involved?
- (vi) The absolute potential energy of a body on the surface of earth is negative. What does it mean?
- (vii) Define Radian.
- (viii) What is Einstein's view of gravitation?
- (ix) Explain the working of a carburetor of a motor-car using Bernoulli's principle.
- (x) What is Torr? How is it related with Pascal?
- (xi) A simple pendulum is 50.0 cm long. What will be its frequency of vibration at a place where $g = 9.8m / sec^2$?
- (xii) A body of mass 4 kg is attached to a spring of spring constant 196 N / m and set into vibration. What is its vibrational angular frequency?
- (xiii) What is Laplace correction?
- (xiv) What are the coherent sources of light?
- (xv) In a double slit experiment the second order maximum occurs at $\theta = 0.25^\circ$. The wavelength is 650 nm. Determine the slit separation.
- (xvi) An astronomical telescope having magnifying power of 5 consists of two thin lenses 24 cm apart. Find the focal lengths of the lenses.
- (xvii) Calculate the critical angle for an optical fibre having core of refractive index 1.50 and cladding of refractive index 1.48.
- (xviii) Write the postulates of kinetic theory of gases.
- (xix) A heat engine performs 100 J of work and at the same time rejects 400 J of heat energy to the cold reservoirs. What is the efficiency of the engine?

- (viii) An airline pilot can find his position on the surface of the earth within accuracy of _____
 A. 100 m B. 10 km C. 10 m D. 1 km
- (ix) The law of conservation of energy is the basis of _____.
 A. Stokes's law B. Bernoulli's equation
 C. Terminal Velocity D. Equation of continuity
- (x) In a mass-spring system, the angular frequency of a vibrating body is _____
 A. $\omega = \sqrt{\frac{k}{m}}$ B. $\omega = \frac{k}{m}$
 C. $\sqrt{\frac{k}{2m}}$ D. $\sqrt{\frac{2k}{m}}$
- (xi) The sharpness of the resonance curve of resonating system depends on (the) _____.
 A. Damping B. Loss of K.E
 C. Loss of P.E D. Loss of K.E. and P.E
- (xii) The speed of sound in water at $20^{\circ}C$ is _____
 A. 332 m / sec B. 1483 m / sec
 C. 315 m / sec D. 972 m / sec
- (xiii) Stars moving toward the earth show a _____
 A. Red shift B. Blue shift C. White shift D. None of these
- (xiv) The process used to determine the concentration of sugar in the blood is called _____.
 A. Polarization B. Optical activity
 C. Glare D. Diffraction
- (xv) The unit of magnifying power of an instrument is _____.
 A. Joule B. Watt
 C. No unit D. Diopter
- (xvi) Critical angle of glass is determined by _____.
 A. Huygens principle B. Snell's law
 C. Law of reflection D. Ohm's law
- (xvii) A gas is enclosed in a container having pressure 'P' and volume 'V'. The product of 'P' and 'V' of the gas is _____.
 A. Power B. Work C. Force D. Temperature

For Examiner's use only:

Total Marks:

17

Marks Obtained:



PHYSICS HSSC-I

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Sections B and C comprise pages 1-2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

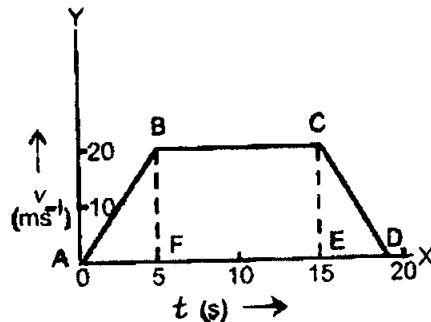
SECTION – B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. (14 x3 = 42)

- (i) The terminal velocity of the water droplet is expressed as $V_t = \frac{2\delta gr^2}{9\eta}$.

Show that this equation is dimensionally consistent.

- (ii) Stand with one arm and the side of one foot pressed against a wall. Can you raise the other leg side ways? If not, then why not?
- (iii) Find the angle between the two vectors $A = 5\hat{i} + \hat{j}$ and $B = 2\hat{i} + 4\hat{j}$.
- (iv) The velocity-time graph of a car moving on a straight road is shown in the following figure. Find the distance covered by the car.



- (v) What are Solar cells? How do they convert light energy into electric energy?
- (vi) How much kilo-joules energy is consumed by a 100 watt bulb in 10 minutes?
- (vii) A circular hoop of mass 2 kg revolves about its own axis with angular speed 5 rad / sec. The radius of hoop is 20 cm. Find the rotational kinetic energy of the hoop.
- (viii) A disc and a hoop start moving down from the top of inclined plane at the same time. Which one will be moving faster on reaching the bottom?
- (ix) A stream of water flowing from a tap becomes narrower as it falls. Why?
- (x) How is the Bernoulli's equation applied to explain the lift on an aeroplane?
- (xi) A simple pendulum is mounted in a lift. How does its time period vary if the lift is moving up with uniform acceleration?
- (xii) What is Resonance?
- (xiii) As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.
- (xiv) State Huygen's principle.
- (xv) How is the distance between interference fringes affected by the separation between the slits of Young's experiment? Can fringes disappear?
- (xvi) Why is it advantageous to use a lens of small focal length in simple microscope?
- (xvii) How is the light signal transmitted through the optical fiber?
- (xviii) What is the average translational kinetic energy of molecules in a gas at temperature 27°C ?
($k = 1.38 \times 10^{-23} \text{ J / K}$)
- (xix) Why can we not construct a heat engine having 100 % efficiency?

SECTION – C (Marks 26)

Note: Attempt any TWO questions. All questions carry equal marks.

(2 x 13 = 26)

- Q. 3**
- a. Define Cross product of two vectors. Explain it with any two examples.
Also write the characteristics of cross product. **08**
- b. Find the angle of projection of a projectile for which its maximum height and horizontal range are equal. **05**
-
- Q. 4**
- a. Define Work done by a constant force. How is the work done in gravitational field?
Prove that gravitational field is a conservative field. **08**
- b. How large must a heating duct be if air moving 3 m/sec along it can replenish the air in a room of 300 m^3 volume every 15 min? Assume the density of the air remains constant. **05**
-
- Q. 5**
- a. Explain Young's Double Slit experiment and show that the bright and dark fringes are of equal width and are equally spaced. **08**
- b. 336 J of energy is required to melt 1 g of ice at 0°C . What is the change in entropy of 30 g of water at 0°C as it is changed to ice at 0°C by a refrigerator? **05**

— 1HA 1408 (ON) —