HALF YEARLY EXAMINATION : 2024-25
CLASS : IX
SUBJECT : PHYSICS

NAME OF STUDENT : ..... MAX. MARKS : 80

DATE : ..... TIME : 2 HOURS

NOTE:- You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper. The time given at the head of this paper is the time allowed for writing the answers.
Section A is compulsory. Attempt any four questions from Section B. The intended marks for questions or parts of questions are given in brackets [ ]

SECTION A

Attempt all the questions from this Section

Question 1 **[1 x 15]**

(i) To increase the frequency of a simple pendulum

(a) length of the pendulum should be decreased. (b) value of g should be increased.
(c) both (a) and (b). (d) none of these.

(ii) Looking into a mirror one finds her image diminished, the mirror is

(a) concave. (b) convex.
(c) plane. (d) none of these.

(iii) When a body is thrown vertically upward then at the maximum height

(a) $\vec{g} = 0$, $\vec{v} \neq 0$. (b) $\vec{g} \neq 0$, $\vec{v} = 0$.
(c) $\vec{g} = 0$, $\vec{v} = 0$. (d) $\vec{g} \neq 0$, $\vec{v} \neq 0$.

(iv) Pure water at 4°C has

(a) maximum density, minimum volume. (b) minimum density, minimum volume.
(c) maximum density, maximum volume. (d) minimum density, maximum volume.

(v) When a body is projected vertically upward and reaches a height in time t_1 and then comes back to the point of projection in time t_2. Which of the following statements is true?

(a) $t_1 > t_2$. (b) $t_1 < t_2$.
(c) $t_1 = t_2$. (d) None of these .

(vi) The time period of the sound wave produced by the tuning fork of frequency 500Hz is

(a) 0.005s . (b) 0.002s .
(c) 0.003s . (d) 0.008s .

(vii) Upto how many decimal places can a screw gauge usually measure the length in cm?

(a) 2 (b) 3
(c) 6 (d) 5

(viii) Force can change

(a) state of rest of a body. (b) state of motion of a body.
(c) dimension of a body. (d) All of these.

(ix) If an incident ray passes through the center of curvature of a spherical mirror, the reflected ray will

(a) retrace its path. (b) pass through pole.
(c) pass through focus. (d) be parallel to principal axis.

(x) In a displacement-distance graph of a wave, the wavelength is the

(a) distance between two consecutive crests. (b) distance between two consecutive troughs.
(c) distance between a crest and a trough. (d) Both (a) and (b).

(xi) Liquids and gases do not have a definite shape so they only have

(a) linear expansion. (b) superficial expansion.
(c) cubical expansion. (d) no expansion.

(xii) If the displacement-time graph of an object is a straight line parallel to time axis, then the object

(a) is moving with constant acceleration. (b) is moving with constant velocity.
(c) is at rest. (d) none of these.

(xiii) For precise measurement Least Count of an instrument should be

(a) as small as possible. (b) as large as possible.
(c) it has no relation with the measurement.. (d) should be 1.

(xiv) Number of images form when an object is kept between two plane mirrors facing each other

(a) infinite. (b) three.
(c) five. (d) two.

(xv) A freely falling body under gravity will move with a

(a) uniform momentum. (b) uniform acceleration.
(c) uniform velocity. (d) non- uniform acceleration.

Question 2

I. Complete the following by choosing the correct answers from the bracket :- **[6]**

(i) In case of concave mirror the minimum distance between the object and its real image Is equal to _____(zero ,focal length , radius of curvature).

(ii) The gravitational force of attraction between two bodies at a distance X is inversely proportional to_____(X^3, X , X^2).

(iii) _____(outside jaws , inside jaws, strip) of vernier callipers is used to measure the external diameter or width of an object.

(iv) _____(area, slope, volume) of velocity- time graph represents acceleration.

(v) 55°C is equal to_____(331°F , 231°F , 131°F).

(vi) In case of longitudinal wave, the particles of the medium vibrate_____(in the direction , at 30° to the direction , at right angle to the direction) of wave propagation.

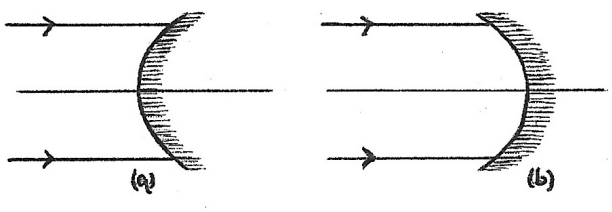
II. Draw the two graphs showing the variation of displacement with time in case of uniform motion and non uniform motion (with uniform acceleration). **[2]**

III. While catching a ball, the cricketer withdraws his hands along with the ball. Why ? **[2]**

Question 3

(i) Convert 250m to μm and Gm. **[2]**

(ii) The diagrams (figures) given below shows two parallel rays incident on a convex mirror and concave mirror respectively. Draw the reflected rays and mark the focus by the symbol F. **[2]**



(iii) When two bodies P and Q are kept in contact, it is found that heat gets transferred from Q to P. [2]

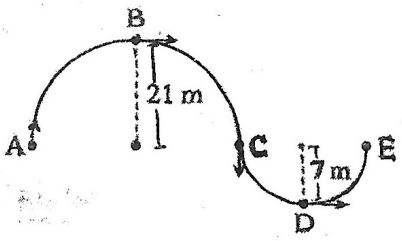
(a) Which of the two (P or Q) is hotter?

(b) Which physical quantity determines the direction of transfer of heat energy?

(iv) If a body moves along a path ABCDE (i.e. along two semicircular paths connected with each other) as shown in the figure given below. Calculate its :- (take $\pi = 22/7$) [2]

(a) displacement

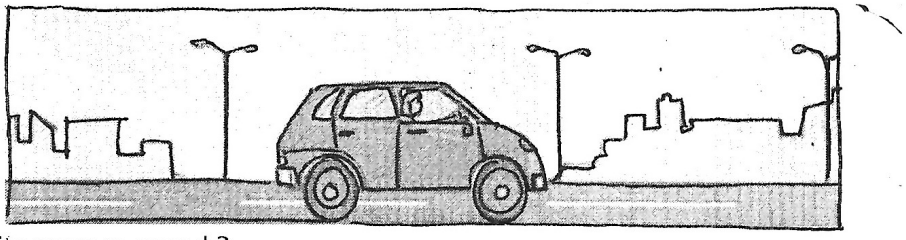
(b) distance



(v) Write the relation between g and G. Also state the S.I. unit of G? [2]

(vi) The speed of sound in the dry still air at 0°C is 330 ms^{-1} then what will be the speed of sound at 20°C ? [2]

(vii) One day Rahul decided to go his office by his car. He is enjoying the driving while listening to old songs. His car is moving along a straight road at a steady speed. On a particular moment, he notices that the car travels 150 m in 5 seconds. [3]



(a) What is its average speed ?

(b) How long does it take to travel 240 m ?

(c) How far does it travel in 6 seconds ?

SECTION B

Attempt any four questions

Question 4

(i) Two bodies A and B of the same mass are moving with velocities v and 3v respectively. [3]
Compare their :-

(a) inertia

(b) momentum

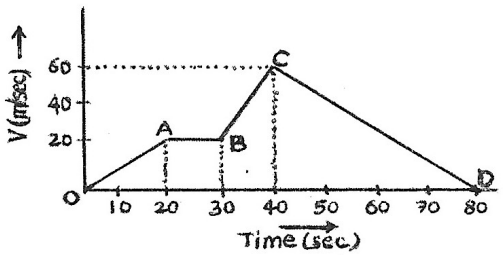
(c) force needed to stop them in same time.

(ii) A ball when thrown vertically upward reaches the height of 49 m in 2s. What will be its :- [3]
(take g=9.8ms^{-2})

(a) initial velocity

(b) velocity at maximum height.

(iii) Study the velocity-time graph given below and answer the following questions :- [4]



(a) Which part shows uniform motion?

(b) Which part represents retardation? Calculate the same.

(c) Calculate the distance travelled by the object in region BC.

Question 5

(i) (a) State Newton's second law of motion. **[3]**
(b) State the relation between newton and dyne.

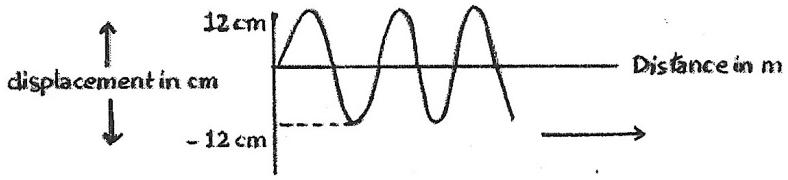
(ii) Draw the graph showing the variation of :- **[3]**
(a) force with mass
(b) acceleration with mass
(c) force with acceleration.

(iii) Write the expression of time period of a simple pendulum in terms of l and g. Also state the three factors on which the time period of the pendulum does not depend. **[4]**

Question 6

(i) Write three characteristics of medium required for the propagation of sound wave. **[3]**

(ii) Study the displacement – distance graph of a wave and answer the questions given below. **[3]**



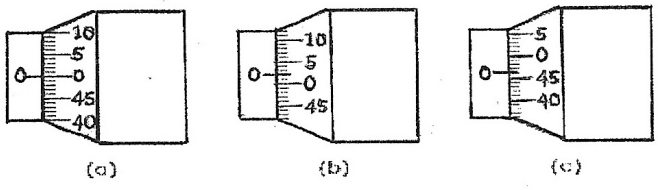
(a) What is the amplitude of the wave?
(b) If the velocity of the wave is 340 ms^{-1}, calculate the wavelength of the wave if its frequency is 20 Hz.
(c) If a wave of same type but with higher frequency is passed in the given medium, will the speed of the wave increase, decrease or remain the same?

(iii) State the range of infrasonic and ultrasonic frequencies. Also state the two properties of ultrasound that make it useful for us. **[4]**

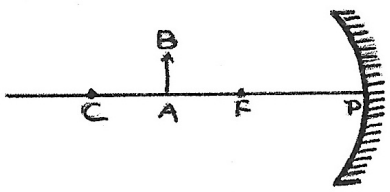
Question 7

(i) (a) What is inertia? **[3]**
(b) Briefly explain why does a passenger fall when he jumps out of a moving train?

(ii) Given below are the positions of two scales (main scale & circular scale) on three different screw gauges upon bringing the two studs in contact with each other. Are they free from zero error ? if not, then specify the type of error they have. **[3]**



(iii) Copy and complete the following ray diagram to obtain the image of the object AB kept in front of the concave mirror. Write the characteristics of the image formed. **[4]**

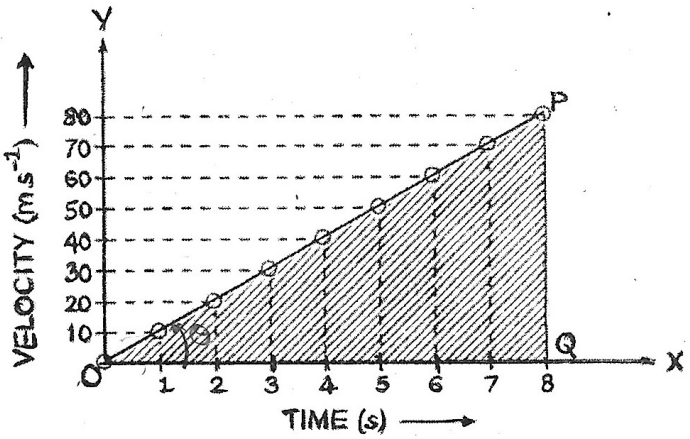


Question 8

(i) Name and state the action and reaction in the following cases :- **[3]**
(a) firing a bullet from a gun
(b) a book lying on a table
(c) motion of boat in water.

(ii) Name the three systems of unit and state the various fundamental units in them. [3]

(iii) The figure below shows the velocity-time graph of a body of mass 5kg moving in a straight line. [4]



Find :-

(a) total displacement

(b) change in momentum

(c) acceleration

(d) force.

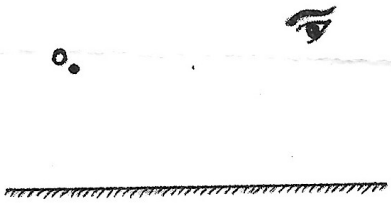
Question 9

(i) (a) State the two laws of reflection. [3]

(b) State the relation of focal length with radius of curvature for mirrors with small apertures.

(ii) Complete the diagram by taking two rays from point O to show the formation of its image. [3]

Is the image formed real or virtual ?



(iii) (a) An object is placed (a) symmetrically (b) asymmetrically, between two plane mirrors inclined at an angle of 70°. Find the number of images formed. [4]

(b) An object is placed at a distance of 52cm in front of a concave mirror of focal length 26cm. Find the position of image. Will the image be erect or inverted ?

--END--