## DELHI PUBLIC SCHOOL NEWTOWN
## SESSION 2022-2023
## FINAL EXAMINATION

**CLASS: IX**                                        **FULL MARKS: 80**
**SUBJECT: PHYSICS [SET A]**                         **TIME: 2 HOURS**

*Answers to this Paper must be written on the paper provided separately.*
*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 [ ]*
*This paper consists of five printed pages*

### SECTION A
*(Attempt all questions from this section)*
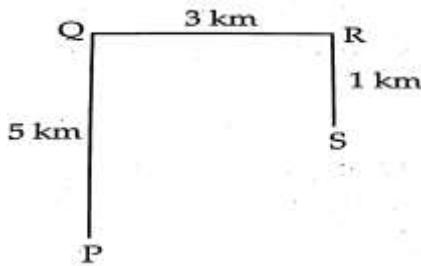
**Question 1**

**Choose the correct answers to the questions from the given options:**      **[15×1 = 15]**

(i) **The unit of Vernier scale is:**
   (a) m          (b) cm          (c) $cm^{-1}$          (d) none of these

(ii) **If the velocity of a body decreases by an equal amount in each second, the velocity-time graph will be a straight line inclined to the time axis with negative slope. The statement is:**
   (a) correct          (b) incorrect          (c) statement is incomplete          (d) none of these

(iii) **The figure below shows the route taken by a van from town P to town S. The displacement of the van is**



   (a) 4.0 km          (b) 7.5 km          (c) 5.0 km          (d) 9.0 km

(iv) **The momentum of a body of mass 3m and velocity v/3 is:**
   (a) ½ mv          (b) $mv^{-1}$          (c) $mv^2$          (d) mv

(v) **In all hydraulic machines**
   (a) Load/Effort $< 1$   (b) Load/Effort $> 1$   (c) Load-Effort = 0   (d) Load + Effort = 0

**(vi)** When a ball hits a wall and rebounds back,
   (a) action and reaction forces act on same body in opposite direction
   (b) action and reaction forces act on different bodies in opposite direction
   (c) action and reaction forces act on same body in same direction
   (d) both (a) and (b)

**(vii)** Assuming that the heights of water are same in the containers, the correct observation is



   (a) the pressure on the bottom of tank A is greater than at the bottom of B
   (b) the pressure on the bottom of the tank A is smaller than that at the bottom of B
   (c) the pressure on the bottoms of A and B are the same
   (d) can't be determined

**(viii)** Choose the correct statement from the following:
   (a) a ship begins to submerge less as it sails from sea water to river water
   (b) a ship begins to submerge more as it sails from sea water to river water
   (c) a ship begins to submerge more as it sails from river water to sea water
   (d) none of the above
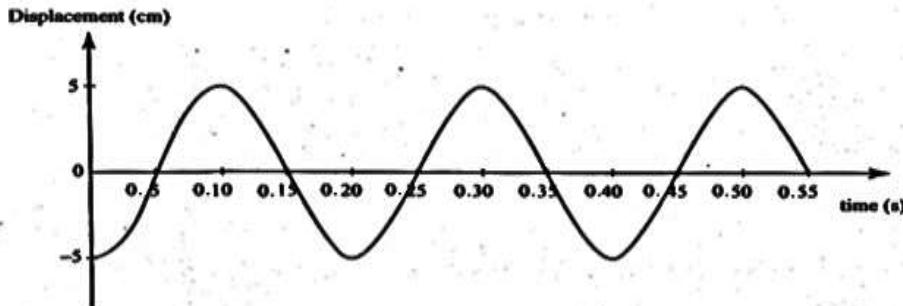
**(ix)** An iceberg is floating partly immersed in sea water of density 1.03 gcm$^{-3}$. The density of ice is 0.92 gcm$^{-3}$. The fraction of the total volume of the iceberg above the level of seawater is:
   (a) 8.1%          (b) 11 %          (c) 34 %          (d) 0.8 %

**(x)** When a lake starts freezing, the formation of ice starts
   (a) at the bottom          (b) at the top          (c) in the middle          (d) everywhere

**(xi)** Observe the graph below and choose the option stating the correct value of time period.



   (a) 0.15 s          (b) 0.20 s          (c) 0.25 s          (d) 0.30 s

**(xii)** The frequency of a sound wave is n and its velocity is v in a medium. If the frequency is increased to 4n, the velocity of the wave will be

(a)  v           (b) 2v           (c) 4v           (d) v/4

**(xiii)** The distance between two bodies becomes 6 times more than the usual distance. then the gravitational force becomes

(a) 36 times        (b) 6 times        (c) 12 times        (d) 1/36 times

**(xiv)** 4000 joule of work is required to transfer 10 coulomb of charge between two points of a resistor of 50 $\Omega$. The current passing through it is

(a) 2A           (b) 4 A           (c) 8 A           (d) 16 A

**(xv)** A boy stands in front of a mirror at a distance of 30 cm away from it. He sees his erect image of height ⅕ times of his actual height. The mirror he is using is:
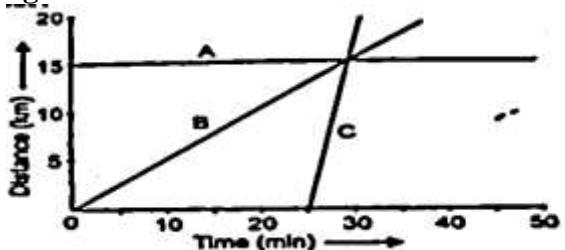
(a) Plane mirror    (b) Convex mirror    (c) Concave mirror    (d) Plano-convex mirror

## Question 2

**(i)** Distance-time graph of three friends A, B and C are shown in the figure below. All of them moving along a straight road in a fixed direction.

     a)   Is any of them at rest?
     b)   When did C start moving?
     c)   Who is moving the fastest?                                [3]



**(ii)** Why does a glass vessel break when it falls on a hard floor, but doesn't break when it falls on the carpet?                        [2]

**(iii)** Name the factors affecting pressure in any fluid.             [2]

**(iv)** Copy and complete the diagram to show the image formed.        [2]



**(v)** A ray of light strikes a plane mirror, such that the angle of incident ray with the mirror surface is 30°. What is the value of angle of reflection? What is the angle between incident ray and reflected ray?            [2]

**(vi)** Which mirror will you prefer as the reflector of the street light. Give one reason in support of your answer.             [2]

**(vii)** Show the forces acting on a body floating partially inside a liquid with help of a labelled diagram.             [2]

**Question 3**

  (i) A bug is crawling on a cycle rim of radius r. What will be the distance and displacement of the bug after (a) half revolution (b) one complete revolution? **[2]**

  (ii) State two advantages of hydro-electricity. **[2]**

  (iii) Is it possible to suck soft drink on the surface of the moon with a straw? Give reason for your answer. **[2]**

  (iv) How does a bat avoid obstacles in their way when in flight? **[2]**

  (v) Draw the necessary graph to find acceleration due to gravity of a place with the help of a simple pendulum. **[2]**

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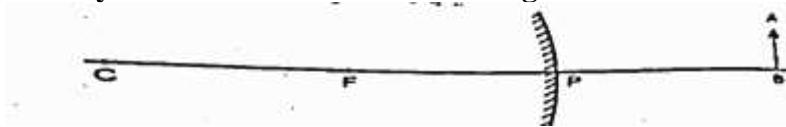
**SECTION B**

**(Attempt any four questions)**

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**Question 4**
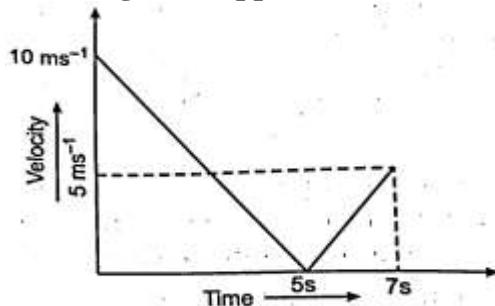
(i) You are required to make an electromagnet using a soft iron bar, a cell, an insulated coil of copper wire and a switch.

  a) Draw a labelled circuit diagram to represent the above.

  b) Name any two factors on which the strength of the magnetic field of an electromagnet depends. **[4]**

(ii) You are given a resistance wire AB connected with a cell and a key. You are required to measure the current in wire AB and the potential difference across it.

  a) Name the instruments that you would use.

  b) Draw a circuit diagram to show how they are connected. **[3]**

(iii) a) Define 1 volt.

    b) A dry cell can supply a charge of 800 C. If a continuous current of 8 mA is drawn. Calculate the time in which the cell will discharge completely. **[3]**

**Question 5**

 (i) Copy the diagram. By taking any two rays from point A, show the formation of the image. Mention any two characteristics of the image formed. **[4]**
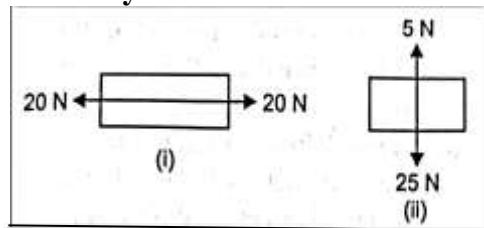


(ii) With reference to the graph shown below describing the motion of a car whose mass is 5 ton, find out

  a) acceleration of the car,

  b) retardation of the car,

  c) retarding force applied for it to come to rest. **[3]**



(iii) At what distance in front of a concave mirror having focal length 10 cm, an object be placed so that it's virtual image of size five times than that of the object obtained? **[3]**

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A/4

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**Question 6**

(i) a) Draw a graph to show the acceleration variance with mass when force is constant.

b) 'When the branches of a tree, laden with fruits are shaken, the fruits fall down'. Explain the reason. **[4]**

(ii) a) State the laws of thermodynamics in energy flow.

b) State one effect of global warming. **[3]**

(iii) a) Define 1 Newton force.

b) Which of the following force diagrams represent an object undergoing uniform motion? give a reason for your answer. **[3]**
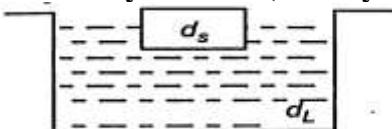


**Question 7**

(i) a) Differentiate between renewable resources and non-renewable resources.

b) Write any two characteristics of standard units. **[4]**

(ii) An electronic oscillator produces ripples in a ripple tank, such that the distance between one crest and the next trough is 4 cm. If the vibrations are produced at a rate of 4800 per minute, calculate a) the time period b) wave velocity. **[3]**

(iii) A stone projected vertically upwards, takes 1.5 s to reach the highest point. Calculate

a) initial velocity of the stone

b) maximum height attained by the stone. **[3]**

**Question 8**

(i) The figure shows a solid of density $d_S$ floating in a liquid of density $d_L$.

a) Compare $d_S$ and $d_L$ with respect to the diagram given below.

b) What is the apparent weight of the floating body?

c) The same solid floats in water with 3/5 part of its volume immersed in it. Calculate the density of solid. (Density of water = 1 g/cm$^3$) **[4]**



(ii) Two identical blocks A and B of different materials float on water such that 90% of and 50% of B remains submerged inside water. Compare densities of A and B. **[3]**

(iii) Why does the atmospheric pressure vary with altitude? Draw a graph to illustrate it. **[3]**

**Question 9**

(i) a) Mention any three factors affecting the resistance of a conductor stating the nature of dependency.

b) "An ammeter must have a low resistance". Justify the statement. **[4]**

(ii) For a freely falling body, draw displacement versus time$^2$ graph. How can one find 'g' from this graph? **[3]**

(iii) Derive the equation $v^2 = u^2 + 2as$ for an uniformly accelerated motion. **[3]**