FINAL EXAMINATION 2024 - 2025

Std. IX Date : 24/02/2025 Sub : Physics Time : 2 hours Marks : 80

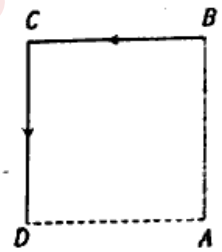
Answer to this paper must be written on the paper provided separately.
You will NOT be allowed to write during the first 10 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allowed for writing the answer.
The intended marks for questions or parts of questions, are given in brackets [ ]

SECTION A
Answer all the questions in this section

Question 1

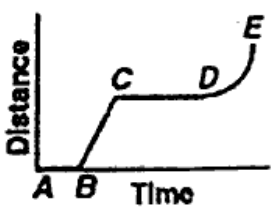
Choose the correct answers to the questions from the given options. [15]
(Do not copy the question, write the correct answers only.)

(i) A particle moves along the sides AB, BC, CD of a square of side 25 m with a 15 m s^{-1}. Its average velocity is:



(a) 15 m s^{-1} (b) 10 m s^{-1}
(c) 7.5 m s^{-1} (d) 5 m s^{-1}

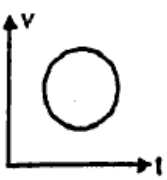
(ii) The graph below represents the relationship between distance and time for an object in motion.
During which interval is the speed of the object changing?



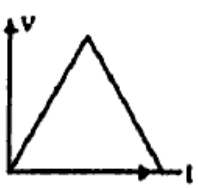
(a) BC (b) CD
(c) DE (d) AB

(iii) Which one of the following (v-t graph) does not belong to motion in one dimension

(a)


(b)


(c)


(d)


(iv) Inertia is responsible for all of these except:
(a) Kicking dirt off a shoe
(b) Throwing a person against a seatbelt
(c) Planets staying in orbit
(d) Gravity

(v) Which of the following statements is / are true?
1. Newton's first law states that F = ma
2. Newton's third law states that every action has an equal and opposite reaction
3. A constant force is required to cause a body to move with a constant velocity

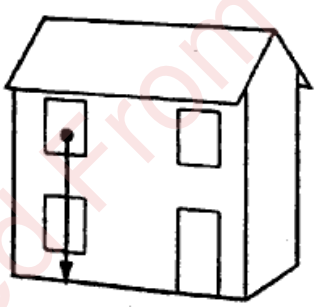
(a) 1,2 and 3 (b) Only 2 and 3 (c) Only 3 (d) Only 2

(vi) Assertion (A): The gravitational force between two bodies remains constant even if the distance between them changes, provided their masses remain the same.
Reason (R): The universal law of gravitation states that the force between two masses depends only on the product of their masses and the square of the distance between them.

(a) Both assertion and reason are true, and the reason is the correct explanation of the assertion.
(b) Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
(c) The assertion is true, but the reason is false.
(d) The assertion is false, but the reason is true.

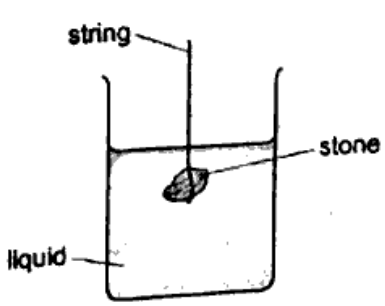
(vii) A particle is moving with a constant speed along a straight-line path. A force is not required to:
(a) increase its speed (b) decrease its momentum
(c) change the direction (d) keep it moving with uniform velocity

(viii) A tennis ball falls from the upstairs window of a house.

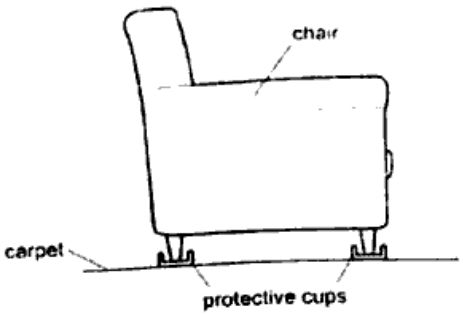


What can be said about the acceleration of the ball if air resistance is ignored?
(a) It depends on the density of the ball.
(b) It depends on the mass of the ball.
(c) It increases as the ball falls.
(d) It stays the same as the ball falls.

(ix) The diagram shows a stone suspended under the surface of a liquid from a string. The stone experiences a pressure caused by the liquid.
What would increase the pressure on the stone.
(a) Decreasing the surface area of the stone
(b) Increasing the mass of the stone
(c) Lowering the stone deeper into the liquid
(d) Using the liquid with a lower density



(x) A chair is place on protective cups to prevent damage to the carpet underneath it.
How do the cups change the area of contact with the carpet and the pressure on it?

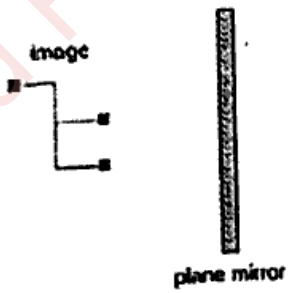


	Area of contact	pressure
(a)	decreased	decreased
(b)	decreased	increased
(c)	increased	decreased
(d)	increased	increased

(xi) Lina and Raj visited a science museum where they learned about heat and temperature. The guide explained, "Temperature measures how hot or cold something is, while heat is the energy that flows from hot to cold objects."
Which of the following statements is true?
(a) Heat and temperature are the same thing.
(b) Temperature measures how hot or cold something is, and heat is the energy transferred between objects.
(c) Heat measures the hotness of an object, and temperature is the energy transferred.
(d) Heat and temperature both measure the energy in an object.

(xii) An optician holds a test card 25 cm behind a patient. When the patient looks into a plane mirror in front of him, the distance between him and the image of the test card is 385 cm.
What is the distance of the patient from the plane mirror?
(a) 60 cm (b) 125 cm (c) 180 cm (d) 235 cm

(xiii) The diagram shows the image of an object in the plane mirror.

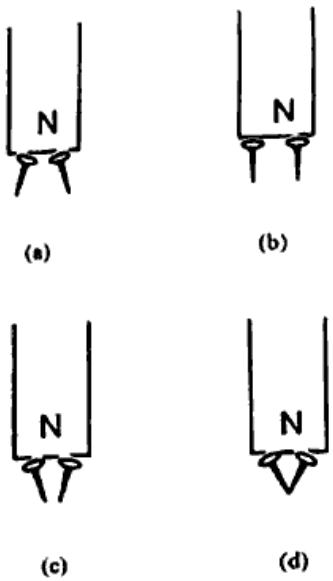


What is the actual appearance of the object?

(a) (b) (c) (d)

(xiv) What condition is necessary for a real image in a concave mirror?
(a) Object smaller than its image
(b) Object outside the focus
(c) Object inside the focus
(d) Object bigger than its image

(xv)
The figure given below shows two iron nails attached to the end of a magnet. Choose the correct figure:



Question 2

(i) Complete the following by choosing the correct answers from the bracket: [6]

(a) The acceleration of an object is directly proportional to the _____ acting on it and inversely proportional to its mass. (force, velocity, displacement)

(b) When an object moves with constant velocity in a straight line, the net force acting on it is _____. (zero, maximum, minimum)

(c) The equations of motion are valid only when the object is moving with _____ acceleration. (uniform, variable, non-uniform)

(d) In an ideal fluid, the pressure exerted at any point is the same in all directions, as stated by _____'s law. (Archimedes, Pascal, Bernoulli)

(e) When two perpendicular mirrors are placed at an angle of 90°, the number of images formed by a point object placed between them is _____. (two, three, four)

(f) The magnetic field inside a solenoid is _____ compared to that of a bar magnet. (uniform, irregular, weak)

(ii) A particle moving with an initial velocity of 8 m s^{-1} is subjected to a uniform acceleration of 2.5 m s^{-2}. Find the displacement in the next 4 s. [2]

(iii) The picture below shows an airbag deployed during a car crash. [2]

Explain how the airbag helps in reducing injuries during the crash.

Question 3

(i) A car starts from rest and accelerates uniformly at a rate of 4 m s^{-2} for a duration of 8 seconds.

(a) Calculate the final velocity of the car after 8 seconds.

(b) Determine the total distance travelled by the car during this time. [2]

(ii) State the pair of action-reaction forces in the following cases. [2]

(a) Skater skating on road.

(b) A girl stepping out of the boat.

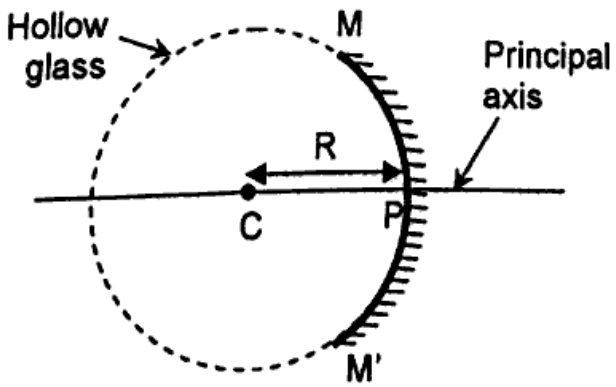
(iii) The following diagram shows milk being poured out of a tin. [2]

(a) Explain why milk does not flow out from the tin.

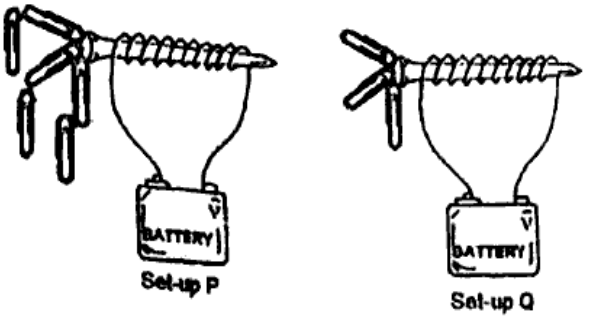
(b) What could be done to make milk flow easily out of the tin?

(iv) State any two differences between heat and temperature. [2]

(v) Define the terms represented as 'R' and 'C' in the following diagram. [2]



(vi) Ethan created two electromagnets using two batteries, some wire and two nails. He coiled the wire 20 times around each nail. He then tested his electromagnets and observed that set-up P could pick up more steel clips than set-up Q. Also, after removal of battery, the steel clips fall off the set-up P but remains attached to set-up Q.



[2]

(a) What is the most likely reason that one electromagnet could attract more paper clips than the other?
(b) What are possible materials used in making nails in set-up P and set-up Q?

[3]

(vii)
(a) State universal law of gravitation.
(b) Write the mathematical equation for the law stated by you in part (a).
(c) What will the change in acceleration due to gravity if mass of body is doubled?

SECTION B

(Attempt any four questions from this Section.)

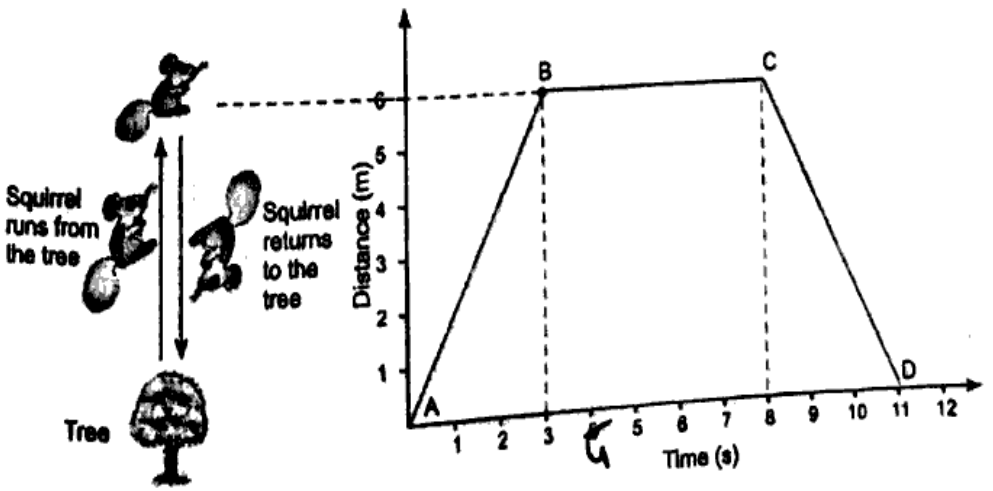
Question 4

(i) [3]

(a) Draw a velocity versus time graph of a stone thrown vertically upwards and then coming downwards after attaining the maximum height.
(b) Also describe whether the motion of the stone in the above case is uniform or non-uniform.

(ii)
Suppose a squirrel is moving at a steady speed from the base of a tree towards some nuts. It then stays in the same position for a while, eating the nuts, before returning to the tree at the same speed. A graph can be plotted with distance on the x-axis and the time on y-axis. Observe the graph carefully and answer the following questions. [3]

(a) Which part of the graph shows the squirrel moving away from the tree?
(b) Name the point on the graph which is 6 m away from the base of the tree.
(c) Which part of the graph shows that the squirrel is not moving?



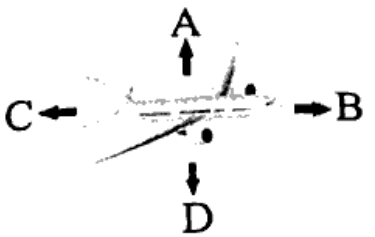
(iii) An electron moving with a velocity of 5×10^4 ms^{-1} enters into a uniform electric field and acquires a uniform acceleration of 10^4 ms^{-2} in the direction of its initial motion. [4]

(a) Calculate the time in which the electron would acquire a velocity double of its initial velocity.

(b) How much distance the electron would cover in this time?

Question 5

(i) There are four types of forces acting on an aircraft during flight, labelled as A, B, C, and D. Answer for each of force A, B, and C whether it is contact forces or a non-contact force?



[3]

(ii) Two identical bullets are fired one by a light rifle and the other by a heavy rifle with the same force. Which rifle will hurt the shoulder more and why? [3]

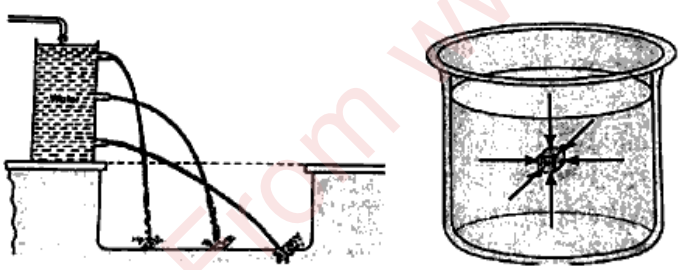
(iii) A child drops a coin from the top of a building, 50 m high. ($g = 10$ m s^{-2}) Calculate: [4]

(a) the velocity of the coin when it falls through 20 m distance,

(b) the velocity with which the coin strikes the ground.

Question 6

(i) State the laws of fluid pressure depicted in the following pictures. [3]



(a) (b)

(c)

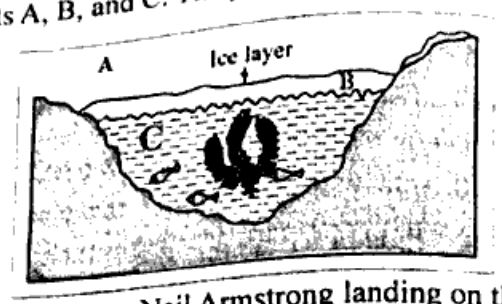
(ii) Copy and complete the following table: [3]

Sudden fall in the barometric height	
	Drought
Gradual rise in the barometric height	

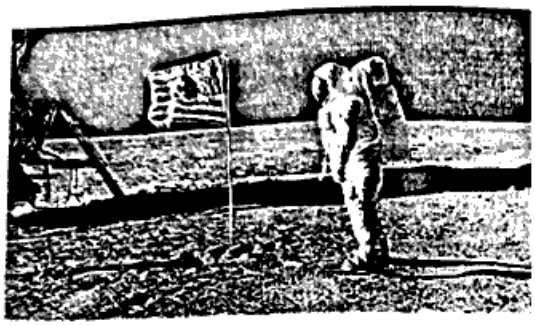
(iii) A force of 500 N is applied to the smaller piston of a hydraulic machine. Find the force exerted on the large piston if the diameter of the piston are 5 cm and 25 cm. [4]

Question 7

(i) Based on the diagram of the frozen lake, please identify which temperature corresponds to each of the points A, B, and C. The possible temperature options are: -4°C, 0°C, and 4°C. [3]

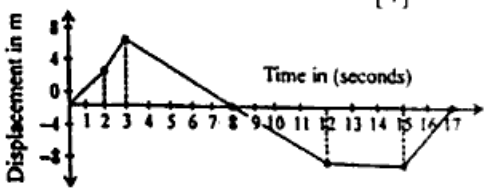


(ii) The picture given shows Neil Armstrong landing on the Moon. The flag inserted by him on the lunar surface was waving on the Moon; explain how this could happen in context of Newton's law of motion, considering that there is no atmosphere on moon to make the flag wave? [3]



(iii) From the displacement-time graph shown below. Calculate: [4]

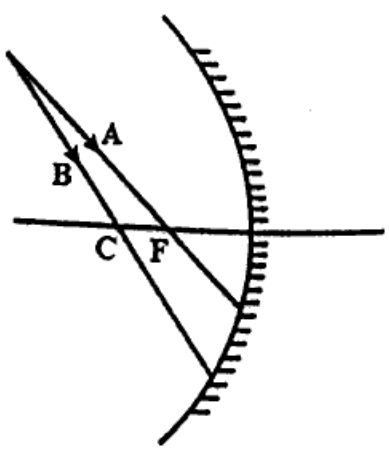
(a) Average velocity in the first three seconds
(b) Displacement from the initial position at the end of 13 second
(c) Time after which the body is at the initial position
(d) Average velocity after 8 second.



Question 8

(i) Neha visited a dentist in his clinic. She observed that the dentist was holding an instrument fitted with a mirror. State the nature of this mirror and reason for its use in the instrument used by dentist. [3]

(ii) Complete the following diagrams in figure by drawing the reflected rays for the incident rays A and B to get the image. [3]



(iii) An object 4 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object. Calculate the height of the image. [4]

Question 9

(i)

(a) What are magnetic field lines?

(b) Justify the following statement [3]

(1) Two magnetic field lines never intersect each other.

(2) Magnetic field lines are closed curves.

(ii) Explain how would the compass needle align itself at the following points: [3]

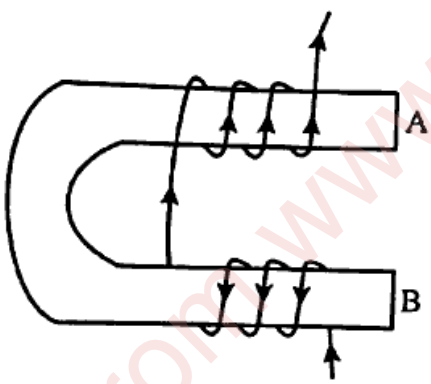
(a) North Pole

(b) Equator

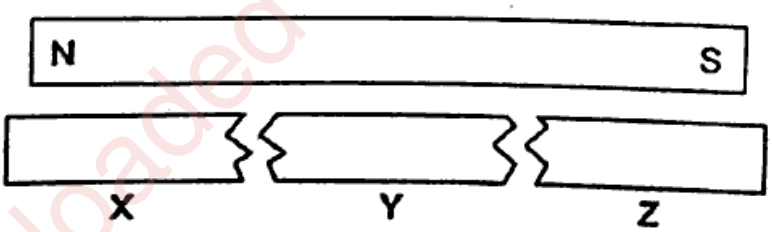
(c) Neutral Point

(iii)

(a) The figure shows the current flowing in the coil of wire wound around the soft iron horseshoe core. State the polarities developed at the ends A and B. [4]



(b) A bar magnet is broken into three parts X, Y and Z.



Redraw the parts X, Y and Z marking the poles at the ends of each part.

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