

MOTITHANG HIGHER SECONDARY SCHOOL

MID-TERM EXAMINATION

PHYSICS-IX

FULL MARK: 100

2017

TIME: 2 hrs 15 mins

READ THE FOLLOWING DIRECTIONS CAREFULLY:

1. Do not write during the first fifteen minutes. This time is to be spent on reading the questions. After having read the questions, you will be given two hours to answer all the questions.
2. In this paper, there are two Sections: A and B. **Section A is compulsory.** You are expected to attempt **any five questions from Section B.**
3. The intended marks for questions or parts of the questions, are given in the brackets [].
4. Read the directions to each question carefully and write all your answers in the answer sheet provided separately.

SECTION A (50 marks)

Compulsory: Attempt ALL questions.

Question I

a. Each question in this section is provided with four possible options. Choose the most appropriate option. [1 X 25 = 25]

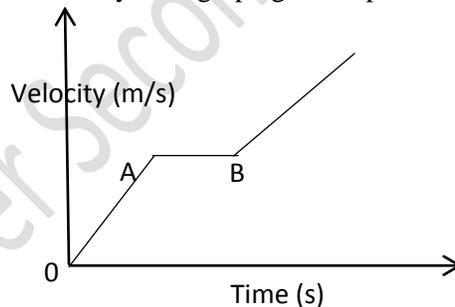
- i. When the distance – time graph is parallel x-axis ,the slope of the graph is
 - A. 1
 - B. Positive
 - C. Negative
 - D. Zero
- ii. When a bus suddenly starts, the passenger in the bus have tendency to fall backward due to
 - A. Inertia of rest
 - B. Newton’s second law
 - C. Newton’s third law
 - D. inertia of motion
- iii. When an object undergoes acceleration
 - A. its speed always increases.
 - B. its velocity always decreases.
 - C. it always fall towards earth.
 - D. a force always acts on it.
- iv. The initial velocity of the body moving from rest is
 - A. 0
 - B. 1
 - C. 3
 - D. 4

- v. Pressure is measured in
- A. Nm^2
 - B. Nm^{-2}
 - C. kgm^3
 - D. kgm^{-3}
- vi. A body immersed in a liquid experiences upward force called
- A. Buoyant force
 - B. Balanced force
 - C. Unbalanced force
 - D. Gravitational force
- vi. The pressure at the bottom of the water is P. If the water is replaced by mercury then the pressure at the bottom will be
- A. Equal to P
 - B. Less than P
 - C. Zero
 - D. More than P
- vii. The area under the velocity – time graph represents the
- A. Total velocity of the body.
 - B. Total acceleration gained by the body.
 - C. Total distance covered by the body.
 - D. Total momentum of the body.
- viii. A 5kg object is accelerating uniformly with $0.5ms^{-2}$ from rest for 10 s. The change in momentum of the object is
- A. $25kgms^{-1}$
 - B. $32kgms^{-1}$
 - C. $30kgms^{-1}$
 - D. $18kgms^{-1}$
- ix. Which instrument measures pressure in gases?
- A. Anemometer
 - B. Barometer
 - C. Manometer
 - D. Thermometer
- xi. During a magical show, a magician pulled the table cloths swiftly without displacing the items on the table. Which of the examples given below applies the same trick?
- A bird flying
 - B photo frame hanging on the wall
 - C pushing a child on a swing
 - D kicking a ball
- xii. Which of the following is a scalar quantity?
- A. Speed.
 - B. Velocity.
 - C. Displacement.
 - D. Acceleration.

- xiii. When the barometric pressure fall gradually, it indicates
- there is possibility of storm and cyclone
 - Rainfall
 - Fair weather
 - Fair weather with possibility of rainfall.
- xiv. Which of the following statement are true regarding velocity-time graph?
- Horizon lines means the body is not moving.
 - Slope of velocity – graph indicates the speed of the moving body.
 - Downward slopping line means the object is returning to the initial position.
 - If the velocity – time graph is linear with positive slope, it means that the body is undergoing uniform acceleration.
- xv. N force accelerates the body of mass 1kg through 1ms^{-2} .
- 1
 - 2
 - 3
 - 0.1

- xvi. Tashi went to offer butter lamp in a nearby monastery. The graph given represents her journey. The part AB of the graph interprets that Karma

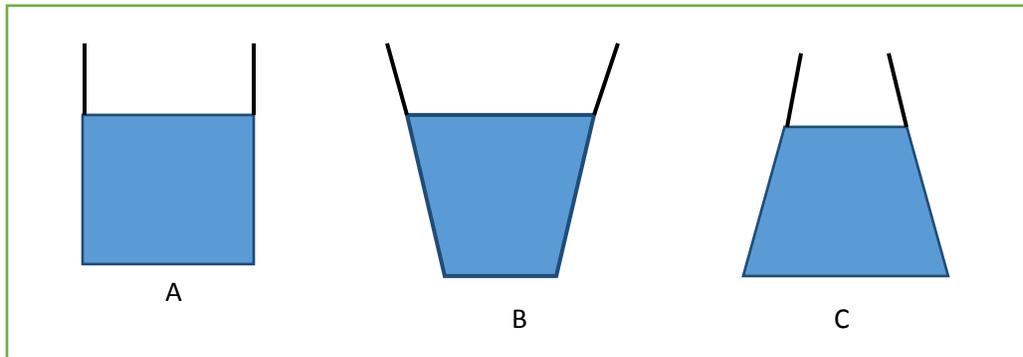
- stopped for some time.
- returned home.
- walked on a leveled ground.
- walked with uniform velocity



- xvii. Which of the following phenomenon is best explained by Newton's third law of motion?
- A coin on a piece of paper remains at the same position, when the piece of paper is removed swiftly.
 - A huge rock rolls over a cliff when pushed over.
 - A toy steam boat moves in water by pushing steam backward into the water.
 - A person getting off a bus runs for some time before stopping.
- xviii. If different liquids are poured in communicating tubes, then the height of the liquids in different tubes will be
- Same.
 - Different.
 - Depending on the shape of the tubes.
 - Depending upon the quantity of liquids.
- xix. When a box floating in water is slightly pushed, then it will remain in that new position. This is an example of
- Stable equilibrium.
 - Unstable equilibrium.

- C. Neutral equilibrium.
- D. Dynamic equilibrium.

xx. In the given three containers, the surface area of the base of all the containers and height of water in them is same. The pressure exerted by water will be



- A. Maximum in container A
 - B. Maximum in container B
 - C. Maximum in container C
 - D. Same in all the containers.
- xxi. Inertia is the property of a body by virtue of which the body is unable to change by itself the
- A. state of rest only.
 - B. state of uniform linear motion only.
 - C. Direction of motion only.
 - D. State of rest and of uniform linear motion.
- xxii. The action and reaction forces referred to in Newton's third law
- A. Must act on the same object.
 - B. May act on different objects.
 - C. Must act on different objects.
 - D. Need not be equal in magnitude but must have same direction.
- xxiii. When a man climbs uphill he should
- A. Lean backward.
 - B. Lean forward.
 - C. Remain straight.
 - D. Keep feet close to each other.
- xxiv. As the depth of liquid increases, the pressure of liquid
- A. Increases.
 - B. Decreases.
 - C. Remains the same.
 - D. Increases in the beginning then decreases.

xxv. The density of iron is 7 g/cm^3 . Its value in S. I. unit is

- A. 7000 kg/m^3
- B. 700 kg/m^3
- C. 70 kg/m^3
- D. 70000 kg/m^3

b. Match each item under column A with the most appropriate item in column B. rewrite the correct matching in the answer sheet provided. [1 X 5 = 5]

Column A	Column B
1) deceleration	a) Comparison of densities of substances.
2) Specific gravity	b) sugar concentration
3) rate of change of momentum	c) density of petroleum
4) Buoyancy	d) Tendency of fluid to make body float.
5) saccharometer	e) Tendency of fluid to make body sink.
	f) $F = ma$
	g) An decrease in a body's velocity
	h) An increase in a body's velocity

c. Fill in the blank by writing suitable word(s). [1 X 5 = 5]

- i. The weight of the liquid displaced act through a point called
- ii. A quantity which can be represented by magnitude and direction is known as
- iii. Momentum is the product of and velocity.
- iv. Lactometer sinks in water than in pure milk.
- v. The atmospheric pressure with altitude.

d. State whether the following statements are 'True' or 'False', and correct the false statement. [10]

- i. When the barometric pressure decreases gradually, it indicates storm and cyclone.
- ii. Acceleration is a scalar quantity.
- iii. Freely falling body on the earth undergoes positive accelerated motion.
- iv. Pressure at a depth is inversely proportional to the density of liquid.
- v. Relative density of a body is usually expressed in kgm^{-3} .

e. Answer the following questions. [5]

- i. Density of ice is 0.9 g/cm^3 . What does it mean? [1]

- ii. A body weighs lesser in water than in air. Explain. [1]
- iii. State: a) Newton's first law. [2]
 b) Principle of floatation.
- iv. why is aneroid barometer preferred over mercury barometer? [1]

SECTION B (50 MARKS)

Attempt any *five* questions.

Question 2

- a. A car moves on a straight road with uniform acceleration. The following table gives the speed of the car at various instant of time:

Time (s)	0	5	10	15	20
Speed(m/s)	5	10	15	20	25

Draw a velocity-time graph choosing a convenient scale. Determine from it

- i. The acceleration of the car.
 ii. The distance covered by the car in 25 seconds. [2X3=6]
- b. Explain: [1 X 4 = 4]
- i. An egg sinks in fresh water but floats in a strong salt solution.
 ii. It is easier to swim in sea water than in river water.
 iii. Ink pen starts leaking at higher altitude.
 iv. The dust particles fall down when a carpet is beaten with a stick.

Question 3

- a. A body initially at rest starts moving with constant acceleration of 2m/s^2 and travels a distance of 25 m. find its final velocity and time taken. [3]
- b. State the action and reaction for the following:
- i. Firing of bullet from a gun
 ii. Hammering of nail into the wood.
 iii. Person walking on the ground. [3]

- c. A mass of an iron is 135 kg and its volume is $15 \times 10^{-2} \text{ m}^3$. Will the iron float or sink in water? Give reason for your answer. [3]
- d. Why is it easier to lift a heavy load inside the water? [1]

Question 4:

- a. The speedometer readings of a car are shown below. Find the acceleration of the car and its displacement.

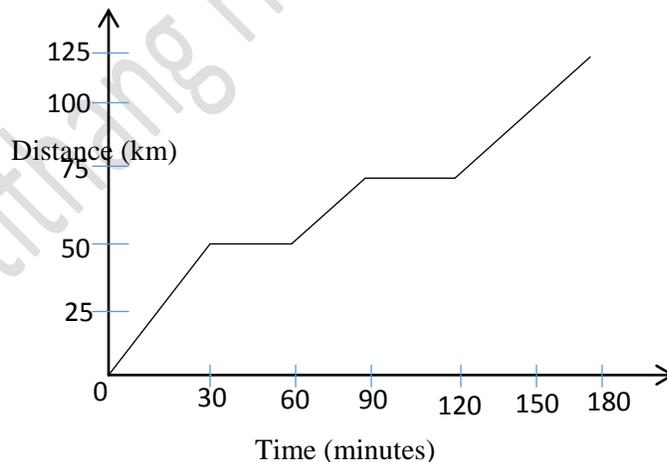
Time	Speedometer
9:25 am	36 km/h
9:45 am	72 km/h

[3]

- b. The normal atmospheric pressure is 76 cm of mercury. Calculate the pressure in SI unit, pascal. (density of mercury = 13600 kg/m^3 , $g = 10 \text{ ms}^{-2}$) [2]
- c. A body weighs 500 gf in air and 350 gf when completely immersed in water. Find the i. volume of the body and ii. upthrust on the body. [3]
- d. Why does a balloon filled with helium rise up in air? Why does it rise to a certain height and do not rise further? [2]

Question 5

- a. Tashi drove 125 km from her office to Phuntsholing. The travel graph below shows her journey.
- For how long did she rest during her journey?
 - How far had she travelled in the first 90 minutes?
 - What is her speed during the last 60 minutes?
- [5]



- b. Explain the following using Newton's first law:
- When the branches of an apple tree are shaken strongly, the apples fall down.
 - When a running horse suddenly stops, the rider falls forward. [1.5 X 2 = 3]

- c. What is used as barometric liquid? Why is water not used? [2]

Question 6

- a. Calculate the pressure at a point that is 100 m below the surface of sea water of density 1150 kg/m^3 . ($g = 10 \text{ m/s}^2$) [2]
- b. An iron nail floats in mercury but sinks in water. Explain why? [1]
- c. Explain how fishes use Archimedes principle to float and sink in water. [2]
- d. Write the conditions for the following:
- The floating body to be in neutral equilibrium.
 - The floating body to be in stable equilibrium. [4]
- e. State Newton's second law. [1]

Question 7:

- a. A solid weighs 20 gf in air and 18 gf in water. Find
- The specific gravity of the solid.
 - Upthrust.
 - Density of solid. [5]
- b. A couple of ice cubes floats in a glass of water. Will the water level in the glass change when the ice cubes have melted? Explain. [2]
- c. Give the three equations of uniform motion. [3]