

**BANGLADESH INTERNATIONAL TUTORIAL LIMITED**

**Physics Worksheet**

**Class XI**

**Subject Teacher: P.K. Saha**

**WEEK 03**

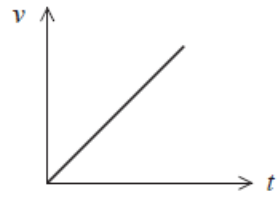
**MARKS: 33**

**STUDENT'S NAME:** \_\_\_\_\_

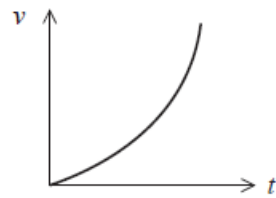
**DATE: 4/4/2020**

1 A moving object has uniform, non-zero acceleration.

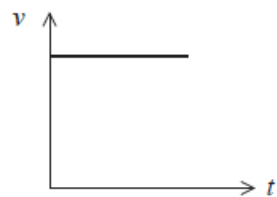
Which velocity-time graph correctly shows this?



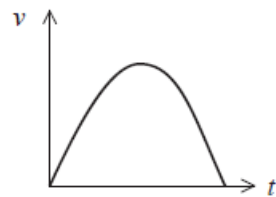
A



B



C



D

- A
- B
- C
- D

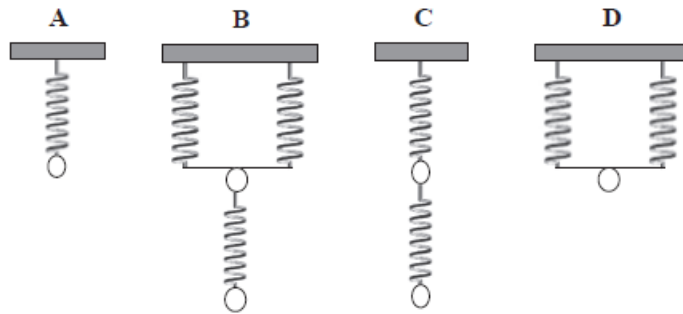
2 Physical quantities are either vectors or scalars.

Select the row of the table which correctly identifies vector and scalar quantities.

	Mass	Velocity	Displacement
<input checked="" type="checkbox"/> A	scalar	vector	scalar
<input type="checkbox"/> B	vector	scalar	vector
<input type="checkbox"/> C	vector	scalar	scalar
<input type="checkbox"/> D	scalar	vector	vector

(Total for Question 2 = 1 mark)

3 The following arrangements all contain identical springs, shown unextended.

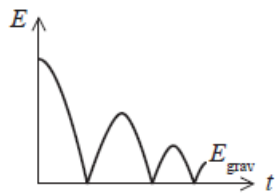


A mass  $m$  is added to the bottom of each arrangement. Which arrangement will produce the greatest total extension?

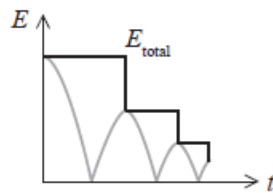
- A
- B
- C
- D

(Total for Question 3 = 1 mark)

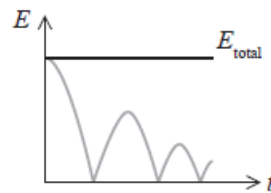
- 4 A ball is dropped and bounces three times before being caught. The following graph shows how the gravitational potential energy  $E_{\text{grav}}$  of the ball varies with time  $t$ .



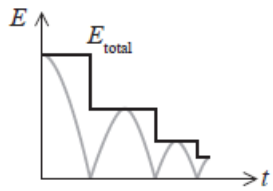
Ignore the effects of air resistance. Select the graph that correctly shows how the total kinetic and potential energy  $E_{\text{total}}$  of the ball varies with time.



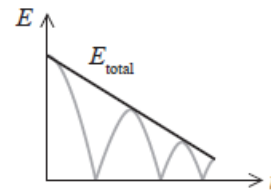
A



B



C



D

- A
- B
- C
- D

5 A force is applied to a length of wire.

Which of the following statements is **not** correct for small deformations of the wire?

- A As the force applied increases, the extension increases.
- B The force applied is directly proportional to the extension.
- C The force applied is directly proportional to the original length.
- D The stress is directly proportional to the strain.

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**(Total for Question 5 = 1 mark)**

6 Aluminium can be used to produce thin sheets of food wrapping because it is

- A brittle.
- B ductile.
- C hard.
- D malleable.

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**(Total for Question 6 = 1 mark)**

7 A motor takes 10 minutes to lift a mass of 40 000 kg through a height of 5 m.

The minimum power of the motor in watts can be found using

- A  $\frac{40\,000 \times 9.81 \times 5 \times 60}{10}$
- B  $\frac{40\,000 \times 9.81 \times 5}{10 \times 60}$
- C  $\frac{40\,000 \times 5 \times 60}{10}$
- D  $\frac{40\,000 \times 5}{10 \times 60}$

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**(Total for Question 7 = 1 mark)**

8 A stone dropped into a well takes 1.5 seconds to reach the water.

Ignoring the effects of air resistance, what distance did the stone fall through?

- A 7 m
- B 11 m
- C 14 m
- D 22 m

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(Total for Question 8 = 1 mark)

9 A swimmer jumps from a diving platform into a swimming pool. The swimmer is slowed to a stop by friction with the water.

The total work done by the water on the swimmer does **not** depend on

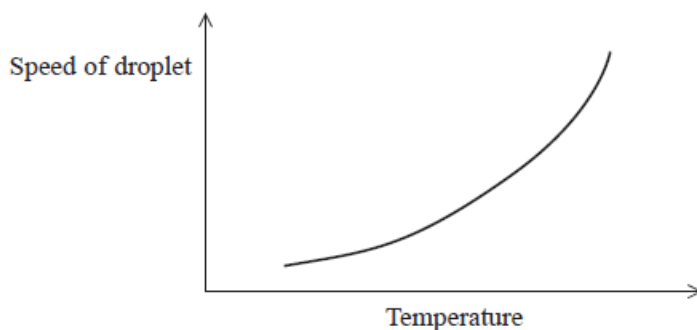
- A the mass of the swimmer.
- B the speed of the swimmer on entering the water.
- C the depth of the swimming pool.
- D the height of the diving platform.

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(Total for Question 9 = 1 mark)

10 A glue dispenser produces small droplets of glue. The glue dispenser contains a small heater.

The graph shows how the speed of a droplet leaving the dispenser varies with the temperature of the glue.



A higher temperature of glue is preferred because

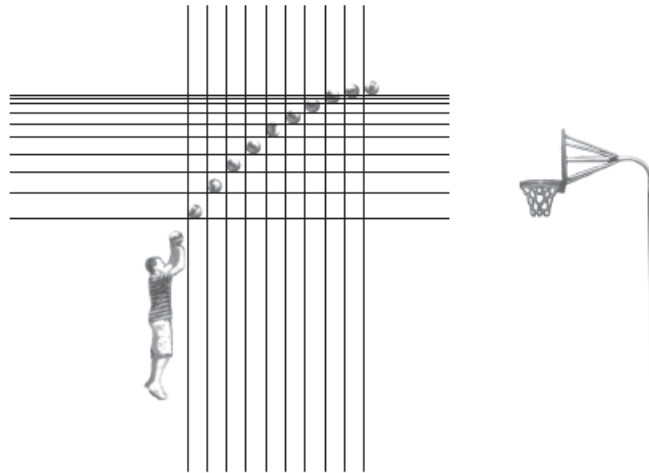
- A the viscosity will be greater and the glue will flow at a greater speed.
- B the viscosity will be greater and the glue will flow at a lower speed.
- C the viscosity will be lower and the glue will flow at a greater speed.
- D the viscosity will be lower and the glue will flow at a lower speed.

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(Total for Question 10 = 1 mark)

11 A basketball is thrown towards a basket. The position of the ball at equal time intervals is shown in the photograph.

Vertical and horizontal lines have been added to the photograph to help identify the ball's horizontal and vertical position.



Suggest a reason for each of the following observations:

(a) the vertical lines are evenly spaced,

(1)

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(b) the horizontal lines become closer together.

(1)

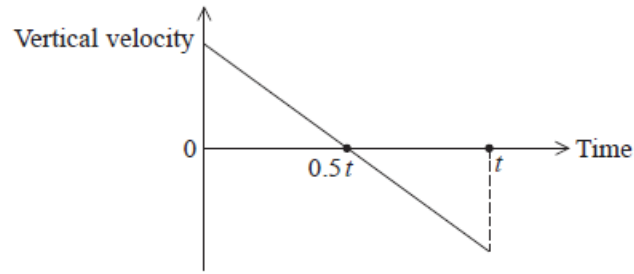
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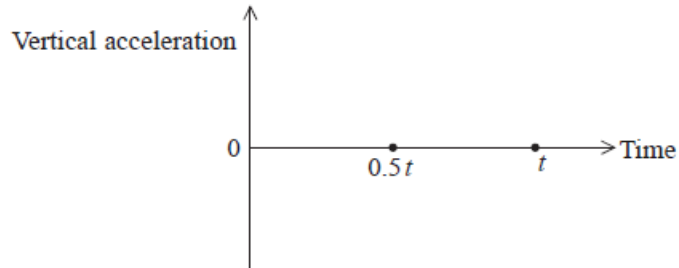
(Total for Question 11 = 2 marks)

12 A cricket ball is hit and travels across a field where it is caught at a time  $t$ . A graph of vertical velocity against time is shown.



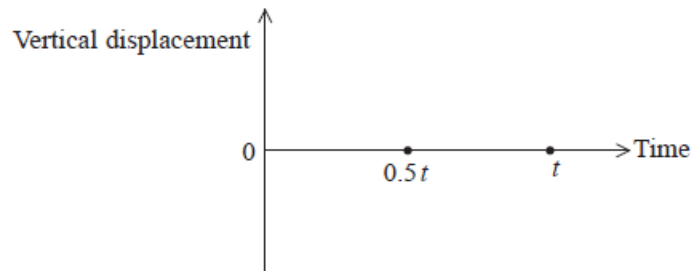
(a) On the axes below, sketch the corresponding graph of vertical acceleration against time for the motion of the cricket ball.

(2)



(b) On the axes below, sketch the corresponding graph of vertical displacement against time for the motion of the cricket ball.

(2)



(Total for Question 12 = 4 marks)



13 A small steel ball is released at the surface of some oil of known viscosity and begins to sink. The diagrams show the forces acting on the ball shortly after its release and when it has reached terminal velocity.



Steel ball shortly after release



Steel ball at terminal velocity

(a) Identify forces X, Y and Z.

(3)

X is .....

Y is .....

Z is .....

(b) A student uses Stokes' law to calculate force Y.

State the measurements the student should make to calculate force Y acting on the ball when it is moving at terminal velocity.

(2)

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(Total for Question 13 = 5 marks)

14 (a) A force is applied across the ends of a sample of wire. For small forces the deformation of the wire is elastic and for large forces the deformation is plastic.

Explain what is meant by the terms

(3)

elastic deformation .....

.....

.....

plastic deformation .....

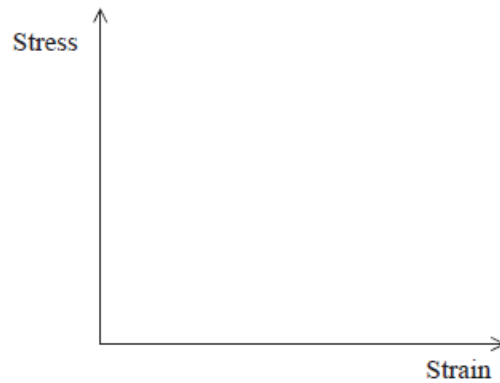
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(b) Copper is a ductile material. This makes copper suitable for the production of wires.

(i) On the axes below, sketch the stress-strain graph for copper.

(2)



(ii) With reference to your graph, state why copper is a suitable material for the production of wires.

(1)

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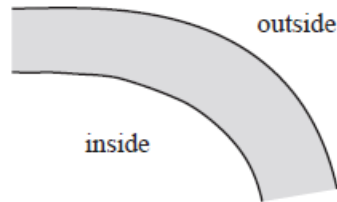
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(Total for Question 14 = 6 marks)

15 Along a river there are changes in the speed of the water due to natural obstacles such as bends and rocks.

- (a) At a bend, the water on the inside of the bend is shallower than the water on the outside of the bend.



Suggest why the speed of the water is lower at the inside of the bend than at the outside of the bend.

(1)

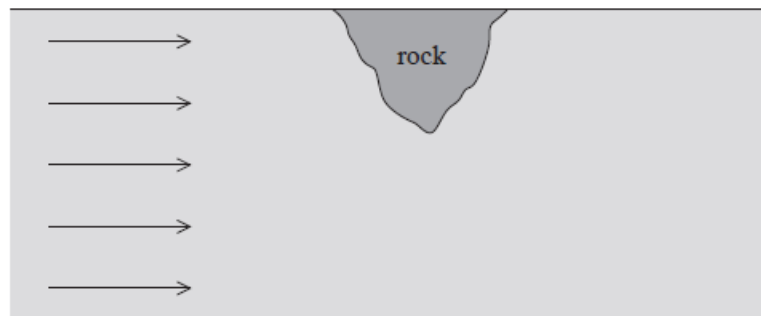
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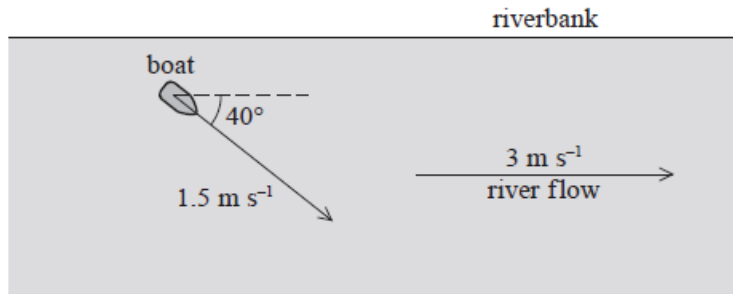
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- (b) On a straight section of the river, the water becomes very turbulent around a large rock. Complete and label the diagram below to show the flow of the water around the rock.

(2)



- (c) The river is flowing at a speed of  $3 \text{ m s}^{-1}$ . A boat is pointed at an angle of  $40^\circ$  to the riverbank and paddled at a speed of  $1.5 \text{ m s}^{-1}$ , as shown in the diagram.



In the space below, draw a vector diagram to scale and use it to determine the magnitude of the actual velocity of the boat.

(3)

Magnitude of actual velocity = .....

(Total for Question 15 = 6 marks)

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