



# Entry Test

Academic Session 2019-20

**PHYSICS**

Total  
Marks **40**

45 min

Class: IG-II(IX)

**Write in block letters:**

Candidate Name

Date

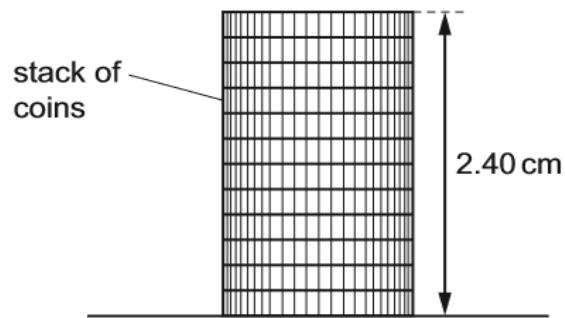
**Kindly read the instructions carefully;**

- 1 Answers must be written in ink.**
- 2 Write the number of question distinctly before each answer.**

**FOR OFFICIAL USE ONLY**

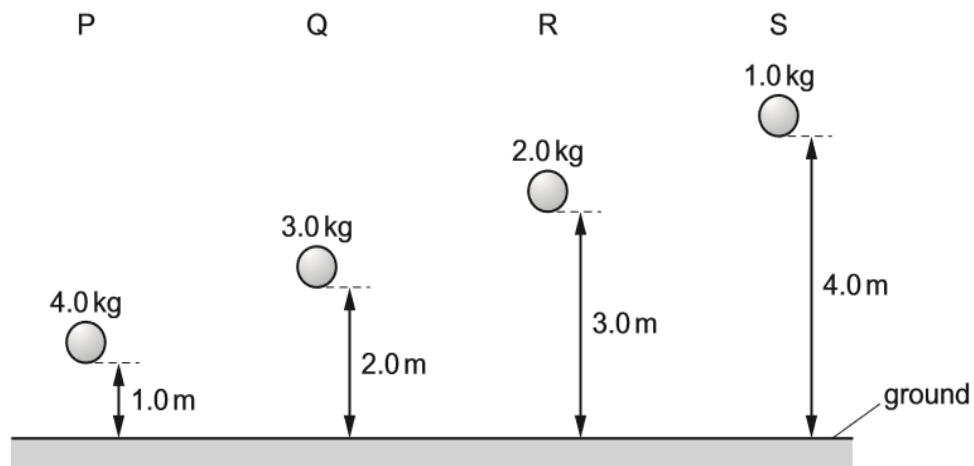
Total Marks		Marks Obtained		Percentage	

- 1 The diagram shows the height of a stack of identical coins.



What is the thickness of one coin?

- A** 0.20 mm      **B** 2.0 mm      **C** 0.24 cm      **D** 2.0 cm
- 2 Four balls with different masses are dropped from the heights shown.

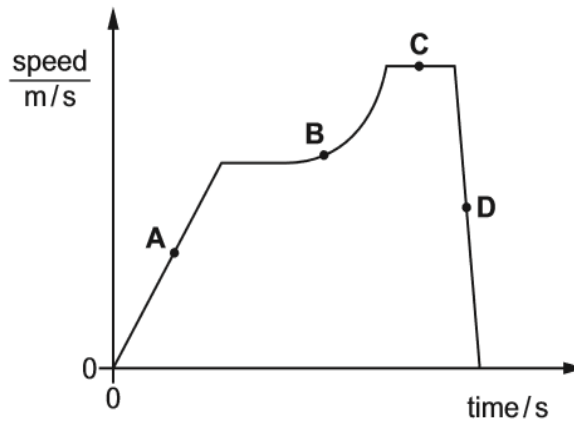


Air resistance may be ignored.

Which statement about the balls is correct?

- A** Ball P has the greatest acceleration.  
**B** Balls Q and R take the same time to fall to the ground.  
**C** The acceleration of ball R is half the acceleration of ball P.  
**D** Ball S has the greatest average speed.

- 3 An object is travelling in a straight line. The diagram is the speed-time graph for the object.  
At which labelled point is the object accelerating at a changing rate?



- 4 Which statement about the masses and weights of objects on the Earth is correct?
- A** A balance can only be used to compare weights, not masses.
- B** Heavy objects always have more mass than light ones.
- C** Large objects always have more mass than small ones.
- D** Mass is a force but weight is not.
- 5 An object in a space probe above the Earth weighs 3.5N. The gravitational field strength at the height of the space probe is 7.0N/kg.

The gravitational field strength on the Earth's surface is 10N/kg.

What are the mass and the weight of the object on the Earth's surface?

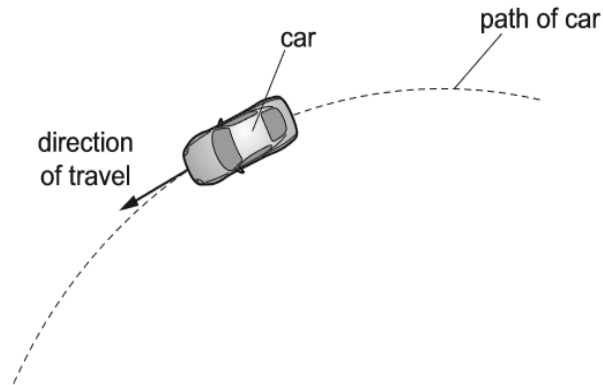
	mass/kg	weight/N
<b>A</b>	0.50	3.5
<b>B</b>	0.50	5.0
<b>C</b>	2.0	3.5
<b>D</b>	2.0	20

- 6 A skydiver jumps from a stationary helicopter and reaches a steady vertical speed. She then opens her parachute.

Which statement about the falling skydiver is correct?

- A As her parachute opens, her acceleration is upwards.
  - B As she falls at a steady speed with her parachute open, her weight is zero.
  - C When she accelerates, the resultant force on her is zero.
  - D When she falls at a steady speed, air resistance is zero.
- 7 A car moves in a circular path as it turns a corner on a horizontal road.

The car moves at constant speed.

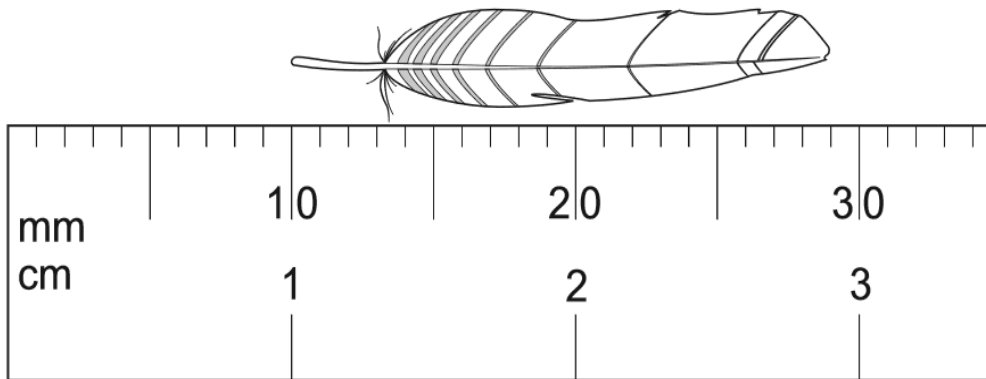


Which description of the forces acting on the car is correct?

- A All the forces are balanced as the car is moving at constant speed.
- B The forces are unbalanced and the resultant force acts away from the centre of the circle.
- C The forces are unbalanced and the resultant force acts towards the centre of the circle.
- D The forces are unbalanced and the resultant force is in the direction of travel of the car.

8

The diagram shows an enlarged drawing of the end of a metre rule. It is being used to measure the length of a small feather.

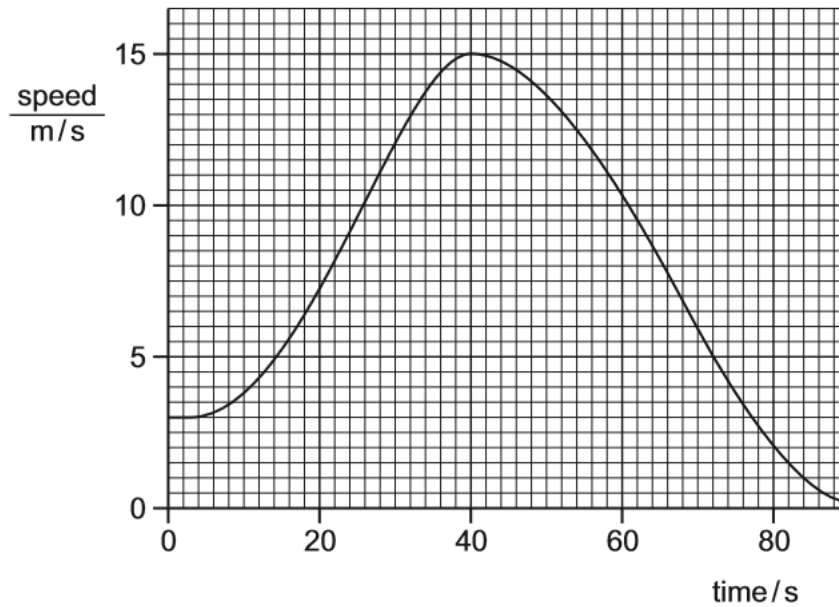


What is the length of the feather?

- A** 19mm      **B** 29mm      **C** 19cm      **D** 29cm

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The speed-time graph shown is for a car moving in a straight line.

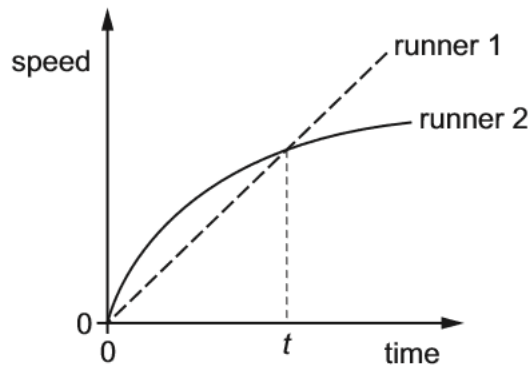


What is the acceleration of the car when the time is 40s?

- A**  $0 \text{ m/s}^2$       **B**  $\frac{15-3}{40} \text{ m/s}^2$       **C**  $\frac{15}{40} \text{ m/s}^2$       **D**  $(15-3) \text{ m/s}^2$

- 10 Two runners take part in a race.

The graph shows how the speed of each runner changes with time.

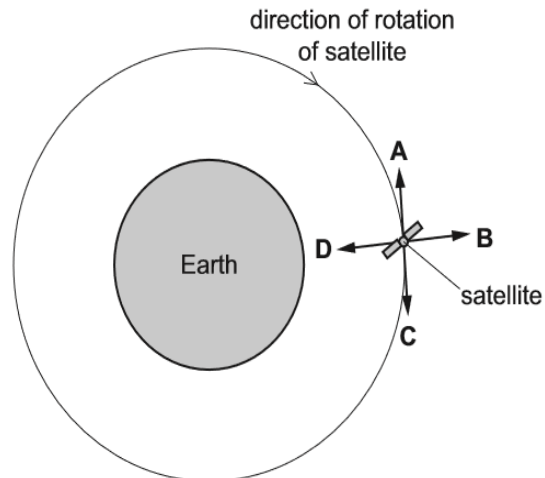


What does the graph show about the runners at time  $t$ ?

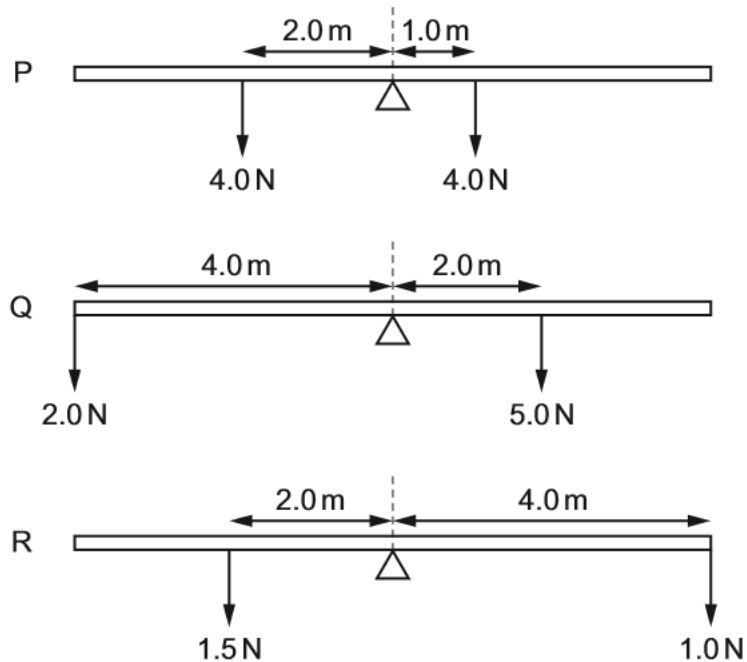
- A** Both runners are moving at the same speed.
  - B** Runner 1 has zero acceleration.
  - C** Runner 1 is overtaking runner 2.
  - D** Runner 2 is slowing down.
- 11 A satellite orbits the Earth above the atmosphere at a constant speed.

The diagram shows the satellite at one point in its circular orbit around the Earth.

Which labelled arrow shows the direction of the resultant force on the satellite at the position shown?



- 12 The diagrams show three uniform beams P, Q and R, each pivoted at its centre. The two forces acting on each beam are also shown.



Which beams rotate clockwise?

- A** P and Q only  
**B** P and R only  
**C** Q and R only  
**D** P, Q and R
- 13 An object of mass 50 kg accelerates from a velocity of 2.0 m/s to a velocity of 10 m/s in the same direction. What is the impulse provided to cause this acceleration?
- A** 250 Ns      **B** 400 Ns      **C** 850 Ns      **D** 2500 Ns
- 14 A scalar quantity has
- A** magnitude and direction.  
**B** no magnitude and no direction.  
**C** magnitude but no direction.  
**D** direction but no magnitude.

- 15 A student measures the volume of a cork.

He puts some water into a measuring cylinder and then one glass ball. He puts the cork and then a second, identical glass ball into the water as shown.

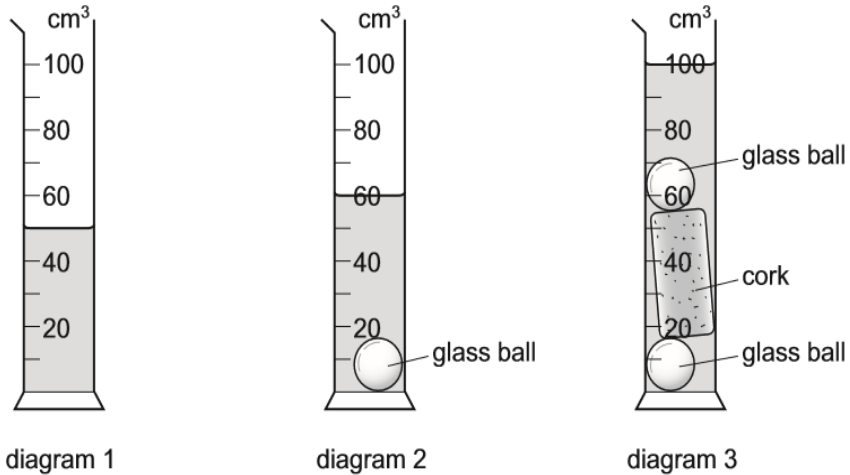


Diagram 1 shows the first water level.

Diagram 2 shows the water level after one glass ball is added.

Diagram 3 shows the water level after the cork and the second glass ball are added.

What is the volume of the cork?

- A** 30 cm<sup>3</sup>      **B** 40 cm<sup>3</sup>      **C** 50 cm<sup>3</sup>      **D** 100 cm<sup>3</sup>



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(a) Fig. 1.1 shows the axes used to plot distance-time graphs.



Fig. 1.1

On Fig. 1.1, draw graphs for an object that is

- (i) moving with constant speed, labelling the graph A,
- (ii) moving with decreasing speed, labelling the graph B.

[2]

(b) Fig. 1.2 shows the axes used to plot speed-time graphs.



Fig. 1.2

On Fig. 1.2, draw graphs for an object that is

- (i) moving with constant acceleration, labelling the graph S,
- (ii) moving with increasing acceleration, labelling the graph T.

[2]

- (c) A plane is at rest on an airport runway. The brakes of the plane are released and the engine of the plane provides a constant accelerating force.

Using the following data, calculate the take-off speed of the plane. Ignore any resistive forces.

constant forward force = 56 000 N  
 mass of plane = 16 000 kg  
 time of travel along runway = 16 s

speed = .....[4]

[Total: 8]

- 17 (a) A stationary object is acted upon by a number of forces.

State the conditions which **must** be true if the object

- (i) does not accelerate,

.....[1]

- (ii) does not rotate.

.....[1]

- (b) Fig. 3.1 shows a boat that has been lifted out of a river. The boat is suspended by two ropes. It is stationary.

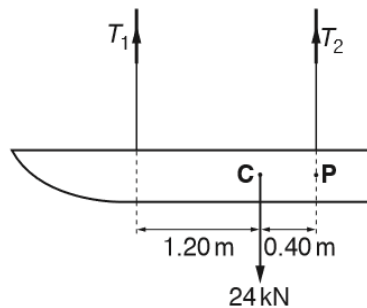


Fig. 3.1 (not to scale)

The weight of the boat, acting at the centre of mass, is 24 kN. The tensions in the ropes are  $T_1$  and  $T_2$ .

Determine

Determine

- (i) the moment of the weight of the boat about the point **P**,

moment = .....[1]

- (ii) the tension  $T_1$ ,

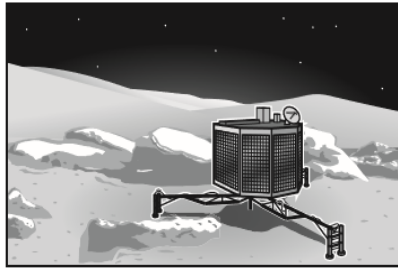
$T_1 = \dots\dots\dots$ [3]

- (iii) the tension  $T_2$ .

$T_2 = \dots\dots\dots$ [2]

[Total: 8]

- 18 Fig. 3.1 shows remote sensing equipment on the surface of a distant planet.



**Fig. 3.1**

- (a) The mass of the equipment is 350 kg. The acceleration of free fall on the surface of this planet is  $7.5 \text{ m/s}^2$ .

- (i) State what is meant by the term *weight*.

.....  
 .....[1]

- (ii) Calculate the weight of the equipment on the planet.

weight = .....[2]

19 (a) State Hooke's Law.

.....  
 .....[1]

(b) For forces up to 120 N, a spring obeys Hooke's Law.

A force of 120 N causes an extension of 64 mm.

(i) On Fig. 2.1, draw the force-extension graph for the spring for loads up to 120 N. [1]

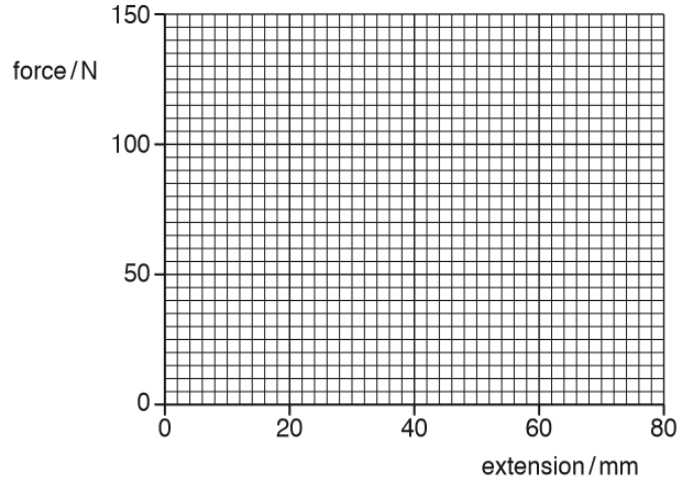


Fig. 2.1

(ii) Calculate the spring constant  $k$  of the spring.

$k = \dots\dots\dots$ [2]

(c) A student makes a spring balance using the spring in (b). The maximum reading of this balance is 150 N.

The student tests his balance with a known weight of 140 N. He observes that the reading of the balance is not 140 N.

Suggest and explain why the reading is **not** 140 N.

.....  
 .....  
 .....[2]

[Total: 6]