Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 2 (Mechanics)

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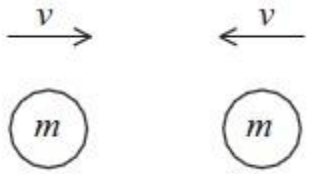
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

Two identical spheres of mass *m* are both travelling with a speed *v* towards each other.



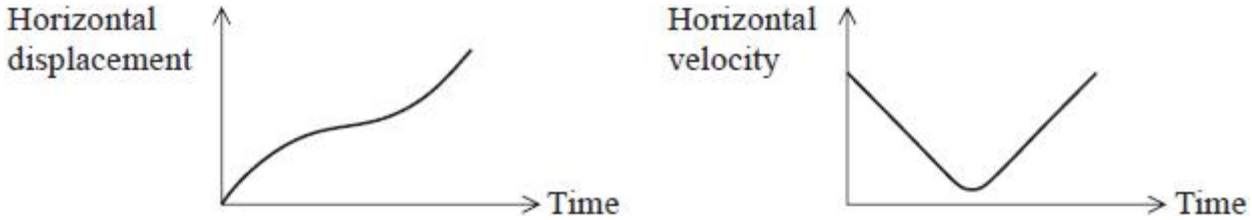
The spheres collide head-on.
Which of the following statements **must** be true after the collision?

- ☒ **A** total momentum = $2mv$
- ☒ **B** total momentum = 0
- ☒ **C** total kinetic energy = mv^2
- ☒ **D** total kinetic energy = 0

(Total for question = 1 mark)

Q2.

The graphs shown represent the displacement-time and velocity-time graphs for the horizontal component of the motion of a ball.



Which of the following situations could produce this motion of the ball?

(1)

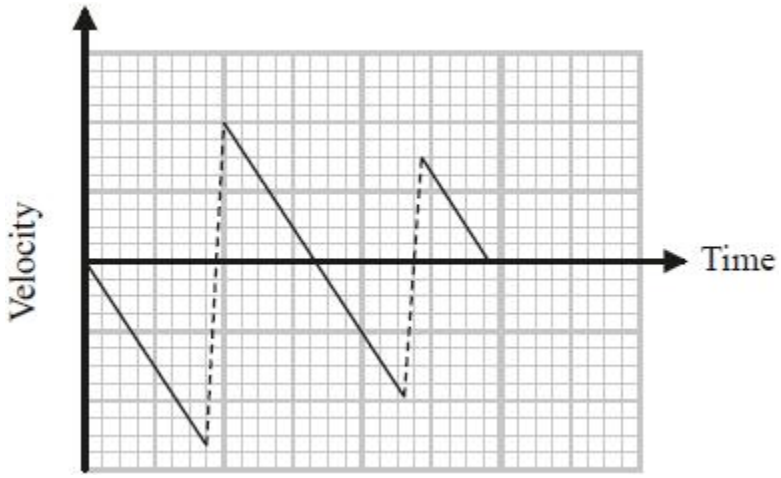
- ☒ **A** Rolling down one ramp and then rolling up a second ramp.
- ☒ **B** Rolling down a ramp then along the floor.
- ☒ **C** Rolling up one ramp and down a second ramp.
- ☒ **D** Rolling up a ramp and rolling back down the same ramp.

(Total for question = 1 mark)

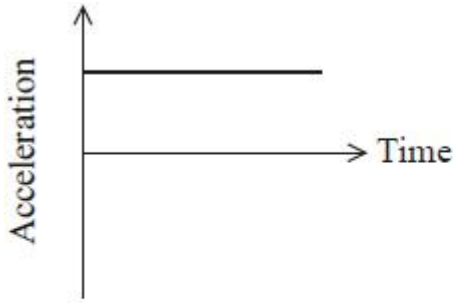
Q3.

A ball is dropped vertically onto a horizontal surface and bounces twice before being caught. The graph shows

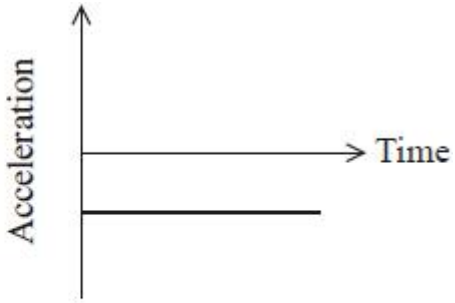
how the velocity of the ball varies with time for the motion of the ball.



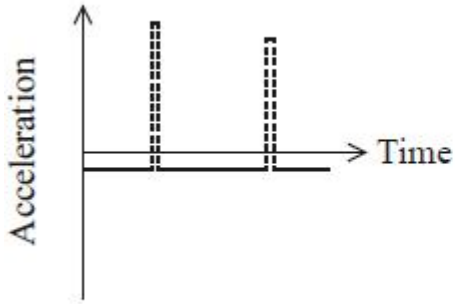
Which of the following is the acceleration-time graph for the motion of the ball?



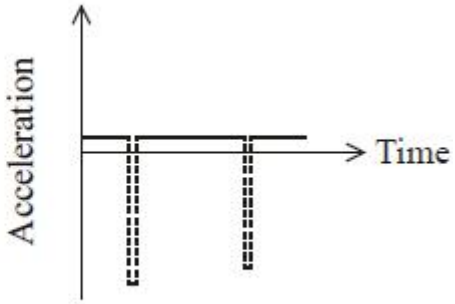
☐ **A**



☐ **B**



☐ **C**



☐ **D**

(Total for question = 1 mark)

Q4.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A car is travelling at a constant speed in a straight line along a horizontal road.

Which row of the table gives a Newton's third law pair of forces?

	Force 1	Force 2
☒ **A**	normal force of car on road	friction between wheels and road
☒ **B**	normal force of car on road	normal force of road on car
☒ **C**	weight of car	normal force of car on road
☒ **D**	weight of car	normal force of road on car

(Total for question = 1 mark)

Q5.
Which of the following descriptions of a material implies that it undergoes significant plastic deformation?

☒ **A** brittle
☒ **B** hard
☒ **C** malleable
☒ **D** stiff

(Total for Question = 1 mark)

Q6.

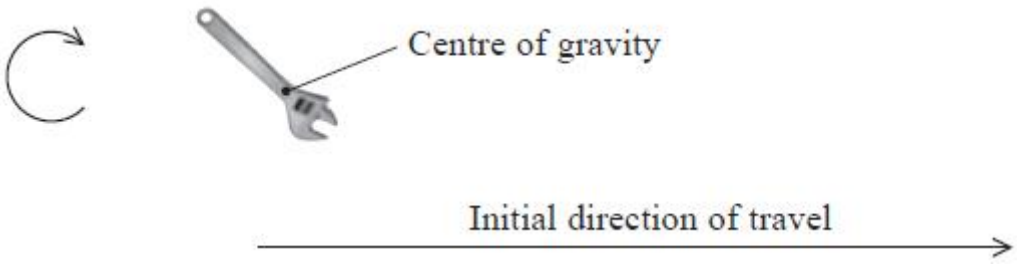
A box is dropped from a plane flying at a constant velocity and height.
Assuming that air resistance is negligible, as the box falls to the ground its horizontal position will

☒ **A** remain unchanged.
☒ **B** lag behind the plane.
☒ **C** move ahead of the plane.
☒ **D** remain directly under the plane.

(Total for question = 1 mark)

Q7.

A spanner is thrown horizontally. As it moves it spins in a clockwise direction in a vertical plane.



Which row of the table could **not** show the relative positions of the spanner when released and during motion?

	Position when released	Position during motion
☒ A		
☒ B		
☒ C		
☒ D		

(Total for question = 1 mark)

Q8.

The photograph shows cars driving around a roundabout at a constant speed.

The resultant force *F* on a car causes it to follow a circular path.

Which of the following statements about *F* is **incorrect**?

- ☒ **A** *F* is equal to the product of the mass and angular velocity of the car.
- ☒ **B** *F* is equal to the product of the momentum and angular velocity of the car.
- ☒ **C** *F* is in the same direction as the acceleration of the car.
- ☒ **D** *F* is perpendicular to the momentum of the car.

(Total for question = 1 mark)

Q9.

Which of the following quantities has the same units as the area beneath an acceleration-time graph?

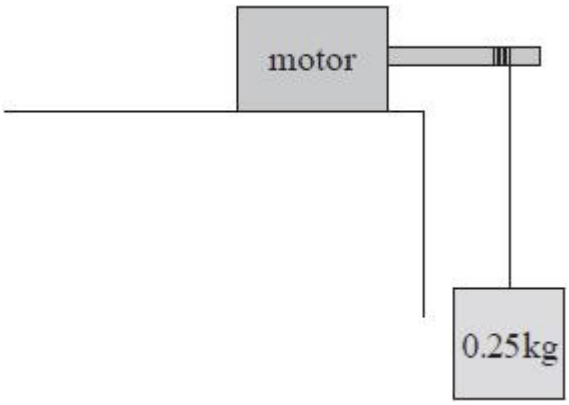
- ☒ **A** acceleration
- ☒ **B** force
- ☒ **C** momentum
- ☒ **D** velocity

(Total for question = 1 mark)

Q10.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A motor is used to lift an object as shown. The object is raised through a vertical height of 75 cm at a constant speed of 0.40 m s^{-1}.



Which of the following gives the rate of increase of potential energy of the object in watts?

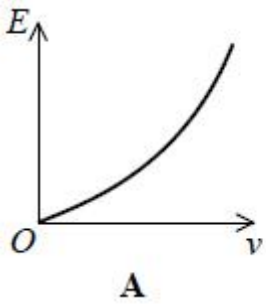
- ☒ **A** $0.25 \times 9.81 \times 0.40$
- ☒ **B** 0.25×0.75
- ☒ **C** $0.25 \times 9.81 \times 0.75$
- ☒ **D** $0.5 \times 0.25 \times (0.40)^2$

(Total for question = 1 mark)

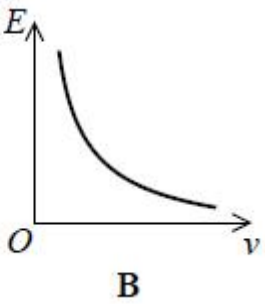
Q11.

A ball is dropped from a student's hand and falls to the ground.

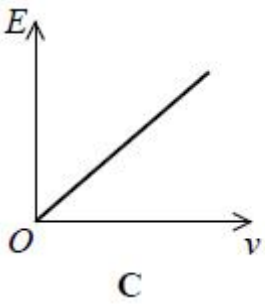
Which graph correctly shows the variation of kinetic energy *E* with velocity *v* for the ball?



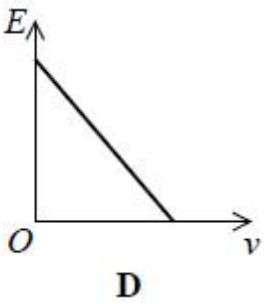
A



B



C



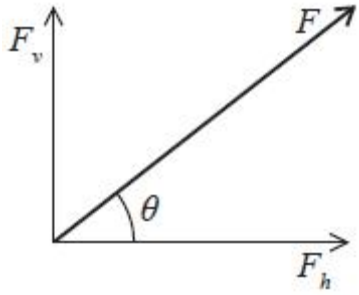
D

- ☒ **A**
- ☒ **B**
- ☒ **C**
- ☒ **D**

(Total for question = 1 mark)

Q12.

A force F is resolved into two components, F_h and F_v, at right angles to one another.



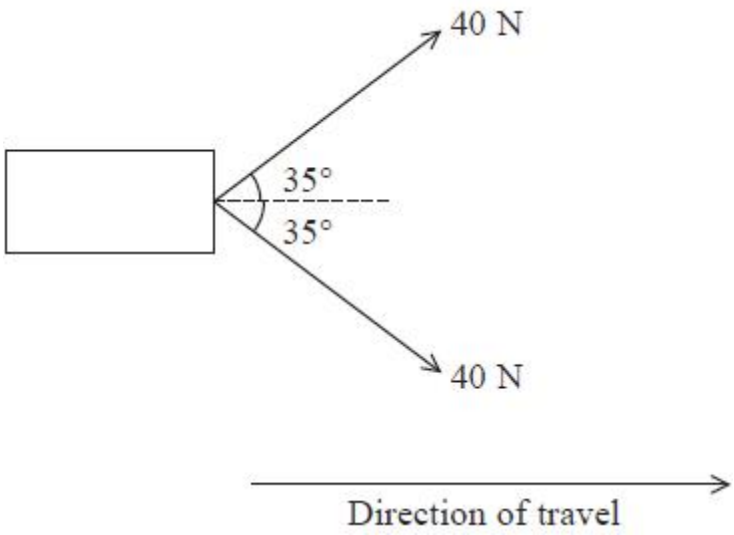
Which statement is **not** true?

- **A** Decreasing θ increases the magnitude of F_h.
- **B** Increasing θ increases the magnitude of F_v.
- **C** F_h and F_v have magnitudes that when added together give a total equal to the magnitude of F.
- **D** F_h and F_v have magnitudes that when added together give a total greater than the magnitude of F.

(Total for question = 1 mark)

Q13.

Two ropes are attached to a box. Each rope is pulled with a force of 40 N at an angle of 35° to the direction of travel.



The box is moved 20m in the direction shown.

The work done, in joules, is found using

☒ **A** 40 × cos35 × 20

☒ **B** 2 × 40 × cos35 × 20

☒ **C** 40 × sin35 × 20

☒ **D** 2 × 40 × sin35 × 20

(Total for question = 1 mark)

Q14.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Which row of the table contains only scalar quantities?

☒ **A**	speed	displacement	current
☒ **B**	energy	mass	momentum
☒ **C**	power	time	work done
☒ **D**	acceleration	work done	temperature

(Total for question = 1 mark)

Q15.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Which of the following is an example of a scalar quantity?

- ☐ **A** displacement
- ☐ **B** energy
- ☐ **C** momentum
- ☐ **D** velocity

(Total for question = 1 mark)

Q16.

Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .

Which of the following quantities is a scalar quantity?

- ☐ **A** energy
- ☐ **B** moment of a force
- ☐ **C** momentum
- ☐ **D** velocity

(Total for question = 1 mark)

Q17.

A student carries out an experiment to calculate a value for *g*, the acceleration of free fall. A marble is dropped from a height of 2.0 m and the time taken for the marble to fall to the floor is recorded.

The following readings were obtained:

0.55 s 0.57 s 0.49 s 0.56 s

Select the equation that would, by itself, enable the student to calculate a value for *g*.

- ☐ **A** $mgh = \frac{1}{2}mv^2$
- ☐ **B** $s = ut + \frac{1}{2}at^2$
- ☐ **C** $v = u + at$
- ☐ **D** $v^2 = u^2 + 2as$

(Total for question = 1 mark)

Q18.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

All quantities may be expressed in terms of SI base units.

Select the row of the table that states the SI base units for the given quantity.

	Quantity	SI base unit
☐ **A**	charge	C
☐ **B**	charge	$A\ s^{-1}$
☐ **C**	power	$J\ s^{-1}$
☐ **D**	power	$kg\ m^2\ s^{-3}$

(Total for question = 1 mark)

Q19.

Which of the following is a derived SI quantity?

- ☐ **A** force
- ☐ **B** length
- ☐ **C** second
- ☐ **D** watt

(Total for Question = 1 mark)

Q20.

The winner of a 400m race must have the greatest

(1)

- ☐ **A** acceleration.
- ☐ **B** average speed.
- ☐ **C** instantaneous speed.
- ☐ **D** maximum speed.

(Total for question = 1 mark)