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南洋女子中學校
NANYANG GIRLS' HIGH SCHOOL
Mid-Year Examination 2017
Secondary Three

PHYSICS

Section A

Thursday

Additional materials: Optical Answer Sheet (OAS)

11 May 2017

1 hour 30 minutes

08:45 – 10:15

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, register number and class in the spaces at the top of this page.

Section A (20 marks)

Do not use staples, paper clips, highlighters, glue or correction tape on the Multiple Choice Answer Sheet provided. Write on it in soft pencil your name, class and register number.

There are **twenty** questions in this section. Answer **all** questions. For each question there are four possible answers, **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the answer sheet.

Section B (30 marks) & Section C (10 marks)

Printed in a separate document.

INFORMATION FOR CANDIDATES

You are advised to spend no longer than 30 minutes on Section A and no longer than 1 hour on Sections B and C.

Take the acceleration due to gravity to be 10 m s^{-2} or gravitational field strength to be 10 N kg^{-1} .

This document consists of **8** printed pages.

Setter: CMH, MS

NANYANG GIRLS' HIGH SCHOOL

[Turn over

Section A (20 marks)

Answer **all** questions.

1 Which of the following is **incorrect**?

A $100 \text{ cm} = 1 \text{ m}$

B $1000 \mu\text{s} = 1 \text{ ms}$

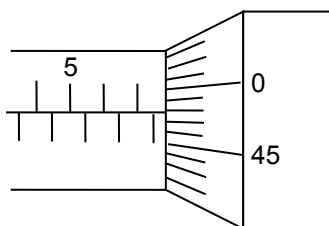
C $1000 \text{ kV} = 1 \text{ MV}$

D $1000 \text{ A} = 1 \text{ mA}$

2 Which of the following lists the precisions of the metre rule and vernier calipers correctly?

	metre rule	vernier calipers
A	0.001 m	0.0001 m
B	0.01 cm	0.001 cm
C	1 mm	0.01 mm
D	0.01 m	0.001 m

3 What is the reading shown on the micrometer screw gauge below?



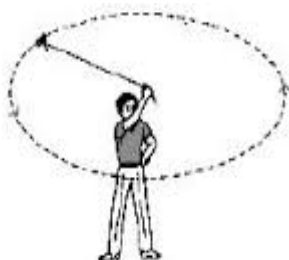
A 7.02 mm

B 7.98 mm

C 10.02 mm

D 10.48 mm

4 A stone tied to a string is swung round continuously in a horizontal plane as shown below. The stone moves 1.0 m every second.



Which of the following statements is true about the motion of the stone?

A The velocity of the stone is constant.

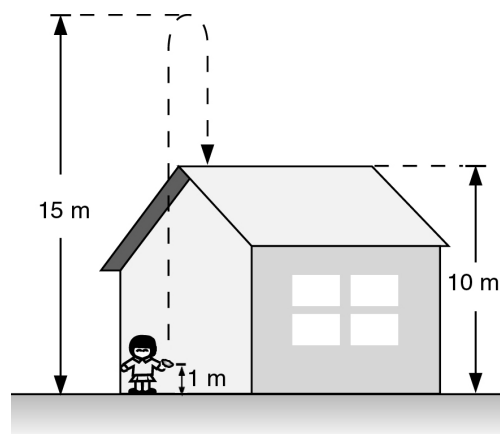
B The acceleration of the stone is constant.

C The displacement of the stone is increasing.

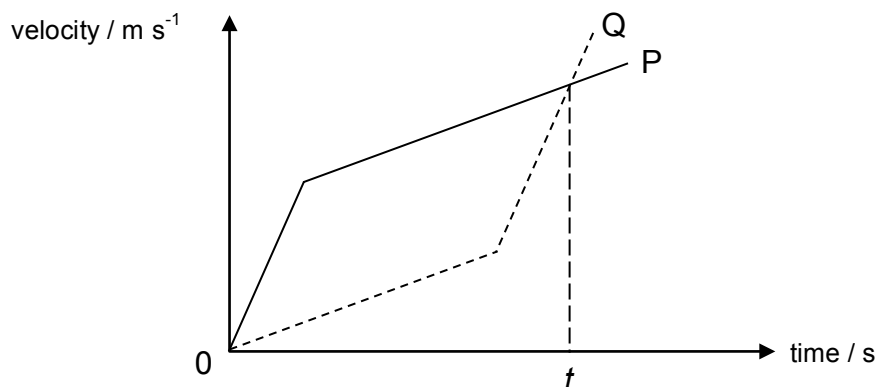
D The distance moved by the stone is increasing.

- 5** The figure on the right shows a girl throwing a stone vertically upwards. The stone leaves her hand when it is 1.0 m above the ground. Then it rises to 15.0 m above the ground and falls down to the roof of a house. The roof of the house is 10.0 m above the ground.

Which of the following pairs of values shows the total distance travelled and the final displacement of the stone in m?



- | | total distance / m | final displacement / m |
|----------|--------------------|------------------------|
| A | 20.0 | 10.0 (upward) |
| B | 20.0 | 9.0 (upward) |
| C | 19.0 | 9.0 (upward) |
| D | 15.0 | 10.0 (upward) |
- 6** Two cars P and Q start from rest simultaneously and travel along the same straight road. The velocity-time graphs of the two cars are shown below.

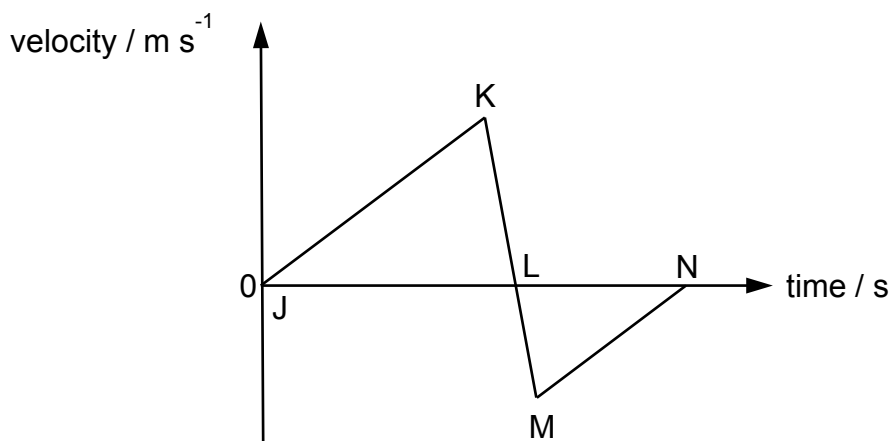


Which of the following statements about the motion of the two cars is always correct?

- A** P and Q have the same average acceleration during the time interval 0 to t .
B P and Q have the same average velocity during the time interval 0 to t .
C P and Q have the same average speed during the time interval 0 to t .
D P and Q travel the same displacement during the time interval 0 to t .

Questions 7 & 8 refer to the graph shown below.

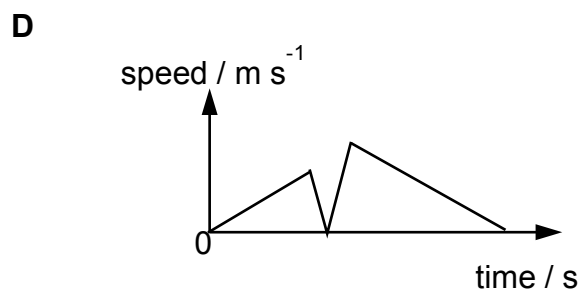
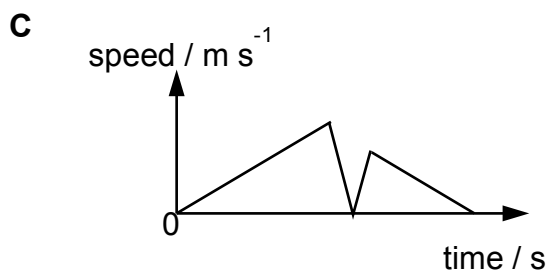
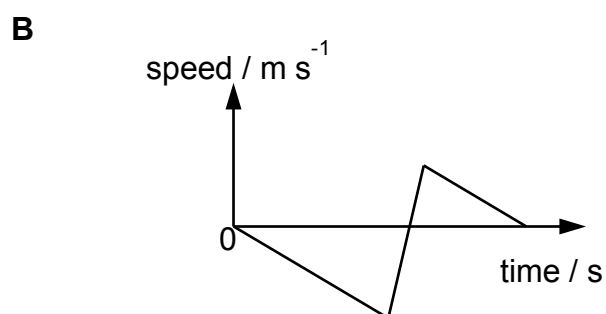
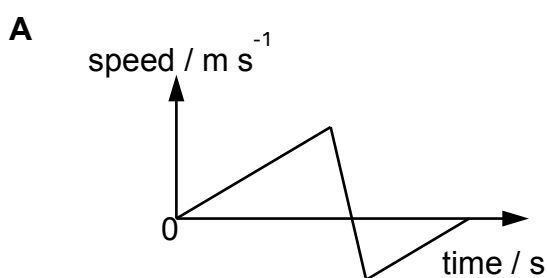
The graph shows the velocity-time graph of an elastic ball moving vertically in air.



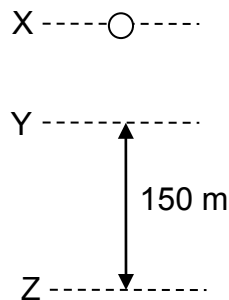
7 Which of the following statements correctly describes the motion of the ball along the sections JKL?

- A** Ball is thrown up from J and reaches its maximum height at K before hitting the ground at L.
- B** Ball is thrown up from J and stops at K before falling down and hitting the ground at L.
- C** Ball is dropped down from J and hits the ground at K, before coming to a momentary stop at L.
- D** Ball is dropped down from J and hits the ground at K, and bounces up to a maximum height at L.

8 Which of the following speed-time graphs shows the same motion?

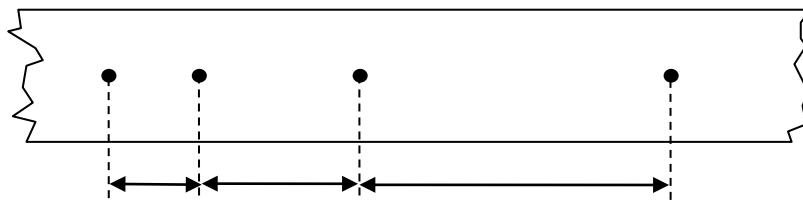


- 9** A body is dropped from rest at height X and falls freely past height Y. 2.0 s after passing height Y, it passes height Z. The difference in height between Y and Z is 150 m.



What is the time taken for the body to fall from X to Z?

- | | |
|----------------|----------------|
| A 5.5 s | B 6.5 s |
| C 7.5 s | D 8.5 s |
- 10** A ticker-timer tape is attached to a trolley that is accelerating down an inclined runway at 500 mm s^{-2} . The diagram shows part of the tape and the distance between successive dots.



What is the vibrating frequency of the ticker-timer?

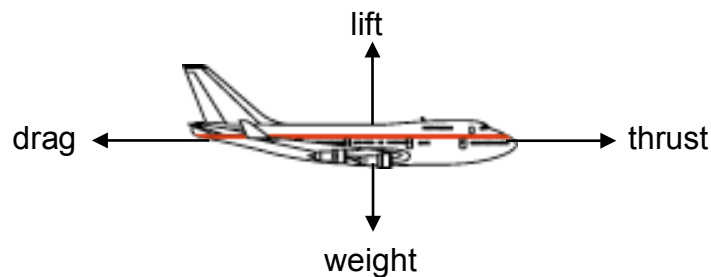
- | | |
|----------------|-----------------|
| A 5 Hz | B 10 Hz |
| C 50 Hz | D 100 Hz |
- 11** A box slides across a horizontal surface in a straight line. It passes a point P with velocity 8.0 m s^{-1} and a point Q with velocity 6.0 m s^{-1} . The time taken to travel from P to Q is 5.0 s.

What is the displacement of the box from point P when it comes to a stop?

- | | |
|-----------------|---------------|
| A - 10 m | B 10 m |
| C - 80 m | D 80 m |

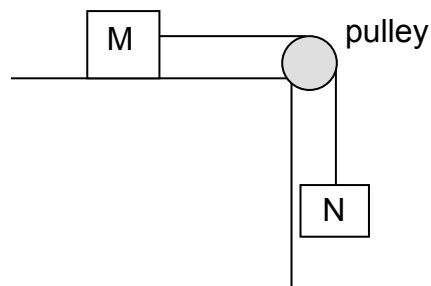
- 12** A cube of metal is cut in half. How does this affect the density?
- A** The density is doubled.
 - B** The density remains the same.
 - C** The density is reduced by half.
 - D** The density cannot be determined unless the density of the metal is known
- 13** Which of the following is/are true for an action-reaction pair of forces?
- (i) the two forces are of the same magnitude
 - (ii) the two forces act on the same object
 - (iii) the two forces act in the same direction
- A** (i) only
 - B** (i) and (ii) only
 - C** (i) and (iii) only
 - D** (i), (ii) and (iii)
- 14** An object falls vertically from rest through the air until it attains its terminal velocity.
- How does the acceleration of the object change during the fall?
- A** The acceleration remains constant at 0 m s^{-2} .
 - B** The acceleration remains constant at 10 m s^{-2} .
 - C** The acceleration increases from 0 m s^{-2} to 10 m s^{-2} .
 - D** The acceleration decreases from 10 m s^{-2} to 0 m s^{-2} .
- 15** A lift with three people inside has a combined mass of 600 kg.
- If the lift is accelerating downwards with an acceleration of 0.800 m s^{-2} , what is the tension in the cable that is holding the lift?
- A** 1 080 N
 - B** 2 040 N
 - C** 5 520 N
 - D** 6 480 N

- 16** The diagram below shows the forces acting on an aeroplane as it approaches Changi Airport.



Which of the following is correct when the aeroplane is descending vertically with a constant speed and decelerating in the horizontal direction?

- A** drag = thrust and lift < weight
B drag = thrust and lift = weight
C drag > thrust and lift = weight
D drag > thrust and lift < weight
- 17** Which of the following **cannot** be the magnitude of the resultant force when two forces of magnitudes 7.0 N and 13.0 N act on an object?
- A** 5.0 N
B 10.0 N
C 13.0 N
D 20.0 N
- 18** Box M of mass 0.50 kg moves along a rough surface at a constant speed as box N of mass 0.30 kg falls.



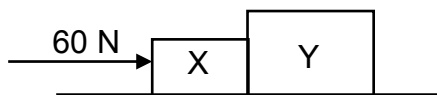
What is the frictional force acting on box M?

- | | | | |
|----------|-------|----------|-------|
| A | 2.0 N | B | 3.0 N |
| C | 5.0 N | D | 8.0 N |

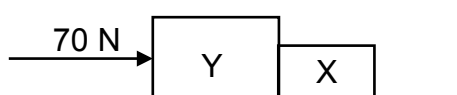
- 19** Box X of mass 2.0 kg and box Y of mass 3.0 kg are in contact in different ways on a smooth surface as shown below.

In which case is the normal contact force between the two boxes the greatest?

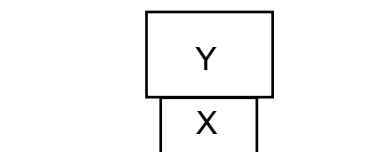
A



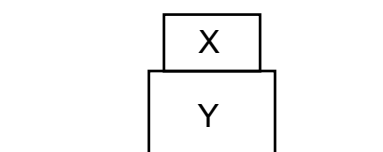
B



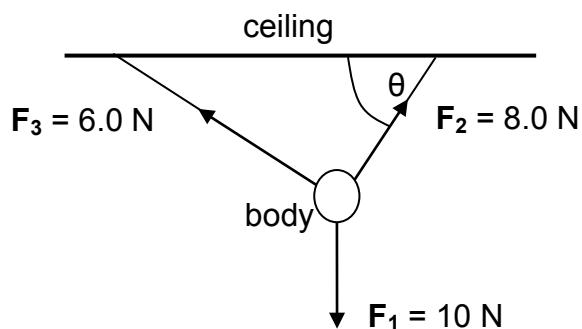
C



D



- 20** A body is in equilibrium under the action of three forces F_1 , F_2 and F_3 as shown below. The force of 8.0 N is inclined to the ceiling with an angle θ . The diagram is not drawn to scale.



What is the angle θ ?

- A** 37°
C 53°

- B** 51°
D 59°

End of Section A