

Name: _____ () Class: _____



華僑中學

HWA CHONG INSTITUTION

Sample Paper C

PHYSICS

Paper 1

Level: Secondary Three

Duration: 45 mins

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

INSTRUCTIONS TO CANDIDATES

Write your name, class and index number in the spaces provided and shade accordingly on the OMR sheet.

There are **thirty** questions on this paper. 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.

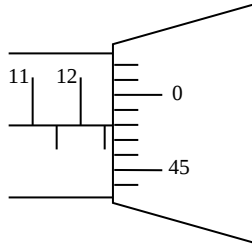
Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Take g to be 10 m s^{-2} or 10 N kg^{-1} unless otherwise stated.

This question paper consists of 12 printed pages, including this page.

1. The diagram below shows a micrometer screw gauge used to measure the thickness of 15 sheets of paper.



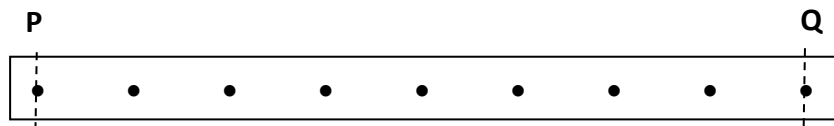
What is the thickness of one sheet of paper?

- | | |
|------------------|------------------|
| A 0.83 mm | B 0.87 mm |
| C 0.90 mm | D 0.93 mm |

2. Which of the following is the correct expression for the velocity of a wave in terms of ρ (density of water), g (gravitational acceleration) and d (depth of water)?

- A** $\sqrt{gd}$
- B** $\sqrt{\frac{g}{d}}$
- C** $\sqrt{\rho gd}$
- D** $\sqrt{\rho g}$

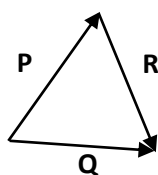
3. A ticker tape timer is used to investigate the motion of an object. The frequency of the ticker tape timer is set to 25 Hz. A portion of the tape is shown below.



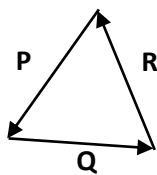
What is the time taken between point **P** and point **Q**?

- | | | | |
|----------|-------|----------|-------|
| A | 0.020 | B | 0.040 |
| C | 0.32 | D | 0.36 |

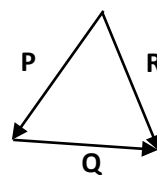
4. Vector **R** is the resultant of vectors **P** and **Q**. Which of the following shows the correct relationship between **P**, **Q** and **R**?



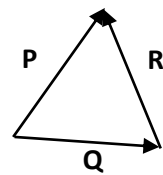
A



B



C

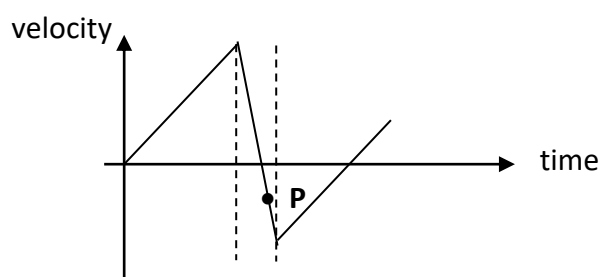


D

5. A man walks 10 m north in 5.0 s, turns east and walks another 10 m for the next 6.0 s. What is the average speed and velocity of the man?

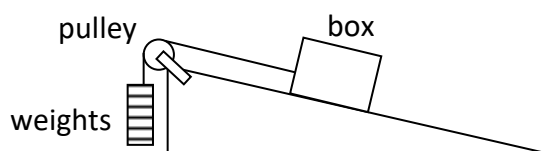
	<u>Average Speed (m s^{-1})</u>	<u>Velocity (m s^{-1})</u>
A	1.8	1.3
B	1.8	2.6
C	1.8	3.6
D	2.0	2.6

6. The diagram below shows the velocity time graph of a rubber ball after it is dropped off a height.



What is happening to the ball at **P**?

- A** Ball is moving downwards and increasing in speed.
B Ball has rebounded off the ground but decreasing in velocity.
C Ball has rebounded off the ground and increasing speed.
D Ball is in contact with the ground and increasing in speed.
7. A second ball is dropped from the same height 1.0 s after the first ball is released. Assuming air resistance is negligible. Which of the following statements is true?
- A** The two balls dropped with constant speed.
B The two balls get further as they descend.
C The two balls maintain a same distance as they descend.
D The two balls get nearer as they descend.
8. A box is shown resting the in position as shown. What is the maximum number of forces that can possibly act on the box?



- | | | | |
|----------|---|----------|---|
| A | 2 | B | 3 |
| C | 4 | D | 5 |

9. A man exerts a force of 50 N and is able to keep a 3.0 kg box moving across a horizontal floor at constant velocity of 2.0 m s^{-1} . Two such boxes are stacked over one another. The man then doubles the applied force on the stack that is at rest on the same floor.

Which of the following describes the motion of the stack of boxes?

- A The box will not move.
- B The box will move at a constant velocity of 1.0 m s^{-1} .
- C The box will accelerate at 15 m s^{-2} .
- D The box will move at a constant acceleration of 17 m s^{-2} .

10. A constant force is applied onto an object which is at rest on a smooth surface as shown in the diagram below.



Which of the following gives the correct ratio?

Kinetic energies at the end of the 1 st second	:	Kinetic energies at the end of the 2 nd second	:	Kinetic energies at the end of the 3 rd second
--	---	--	---	--

- | | |
|---------------------------------------|---------------------------------------|
| <p>A 1 : 1 : 1</p> <p>C 1 : 3 : 5</p> | <p>B 1 : 2 : 3</p> <p>D 1 : 4 : 9</p> |
|---------------------------------------|---------------------------------------|

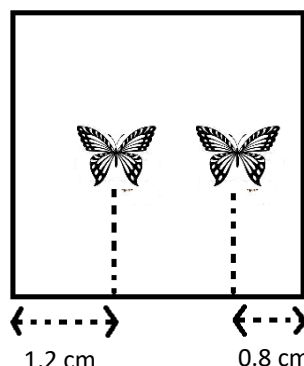
11. Parallel rays of light striking a convex lens meet at a point. Light rays near the edge of the lens bend more than those passing near the centre. Which of the following statements is true?

- I the incident angles increase as the light strikes further from the centre.
- II light rays near the edge bend more as the speed slows down more.
- III refractive index of lens is lower at the edges than the centre.

- | | |
|--|--|
| <p>A I only</p> <p>C I and II only</p> | <p>B II and III only</p> <p>D I, II and III only</p> |
|--|--|

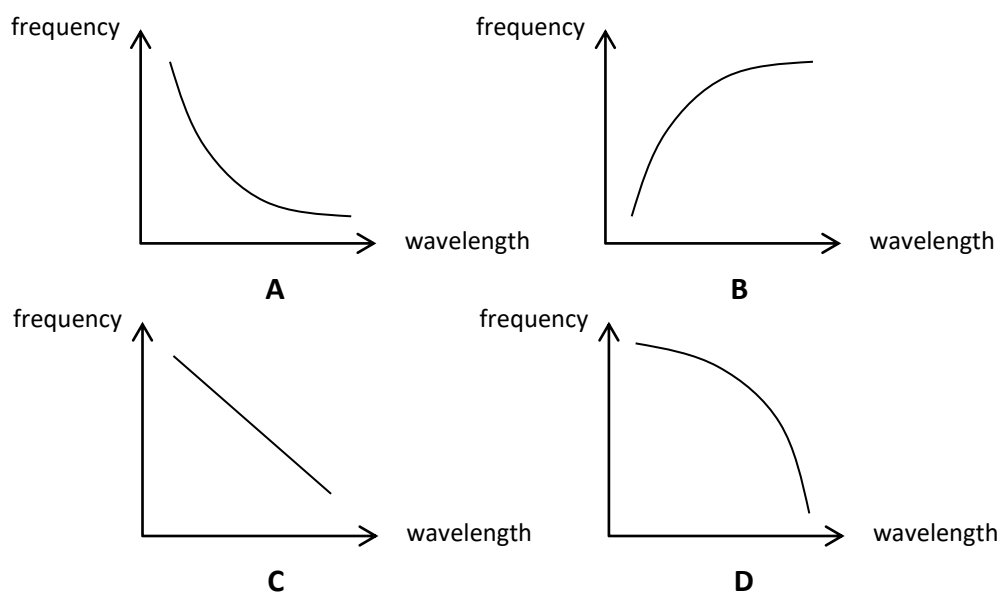
12. A butterfly is preserved in a glass cube. When viewed from one side, it seemed to be 0.80 cm from the surface; and when viewed from the opposite side, it seemed to be 1.2 cm from the surface.

What is the volume of the glass used to make the cube if the refractive index of glass is 1.5? (You may neglect the volume of the butterfly)



Not to scale

- A 8.0 cm^3 B 9.0 cm^3
 C 25 cm^3 D 27 cm^3
13. Which of the following graphs correctly show the relationship between the frequency and wavelength of electromagnetic waves?



14. A radar station sends out a pulse of radio wave from the earth to the moon. The signal is reflected off the moon and returns 2.6 s later. What is the distance between the moon and the earth?

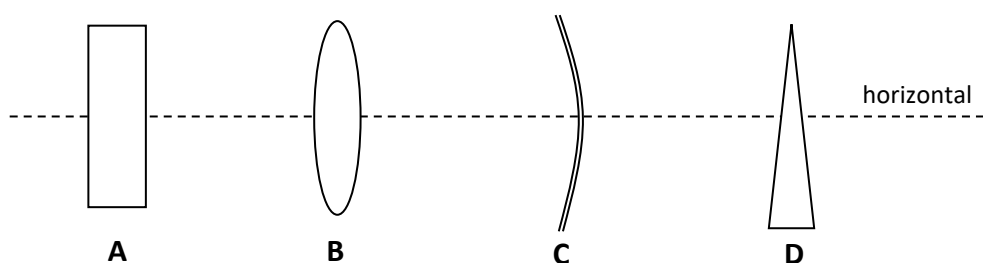
- A $1.9 \times 10^8 \text{ m}$ B $3.0 \times 10^8 \text{ m}$
 C $3.9 \times 10^8 \text{ m}$ D $7.8 \times 10^8 \text{ m}$

15. Regardless of the position of the screen, a student was unable to get an image of an object on it when he placed the object between 19 cm to 21 cm from the lens.

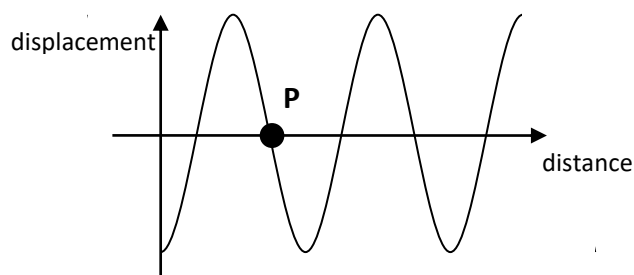
While trying different combinations of object and screen distances, he managed to form a sharp image on the screen 35 cm away from the lens. Where is the likely position of the object from the lens?

- | | |
|----------------|----------------|
| A 10 cm | B 20 cm |
| C 23 cm | D 46 cm |

16. A ray of light is incident on a glass surface at an angle to the horizontal. Light will pass through one side and exit through the other side. Through which of the objects will the path of light **not** likely to deviate?



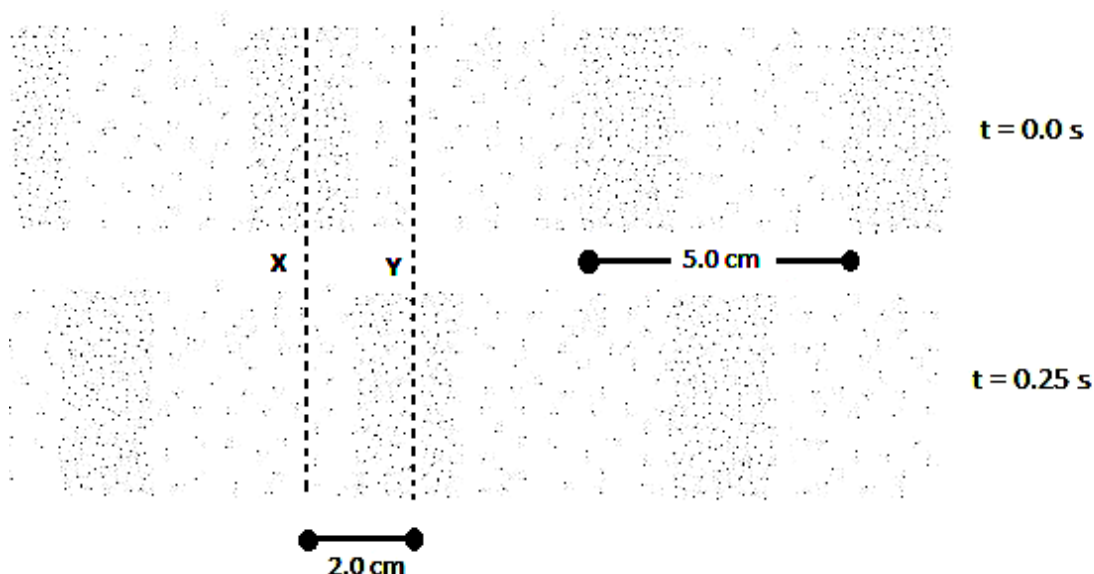
17. The diagram below shows the displacement-distance graph of a wave that has a frequency of 5 Hz.



What is the amplitude and speed of the particle, **P**, 0.3 s later?

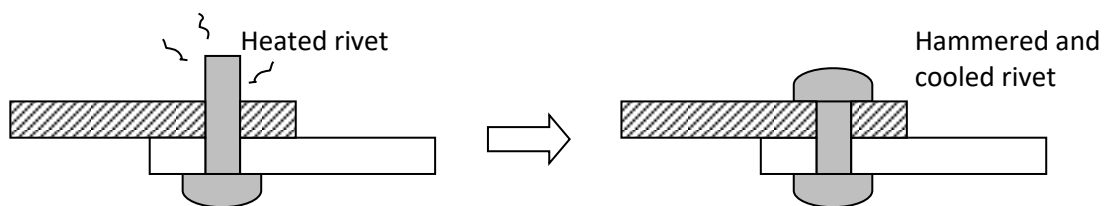
- | | <u>Amplitude</u> | <u>Speed</u> |
|----------|-------------------------|---------------------|
| A | zero | zero |
| B | zero | maximum |
| C | maximum positive | zero |
| D | maximum negative | maximum |

18. The diagram below shows a photographic snap shot of particles taken at an interval of 0.25 s. During this interval, the wavefront was seen to move from line X to line Y. Distances between points are indicated as 5.0 cm and 2.0 cm respectively.



What is the frequency of the wave?

- A 1.6 Hz
B 8.0 Hz
C 40 Hz
D 6.0 GHz
19. Hot metal riveting involves first inserting a red hot rivet through two plates and hammering to deform its body to form a second head. Subsequently the rivet is cooled and the plates are firmly joined together.



Which of the following describes the molecular energy as the rivet is cooled?

- | <u>Kinetic Energy</u> | <u>Potential Energy</u> |
|-----------------------|-------------------------|
| A Increase | Increase |
| B Increase | Decrease |
| C Decrease | Increase |
| D Decrease | Decrease |

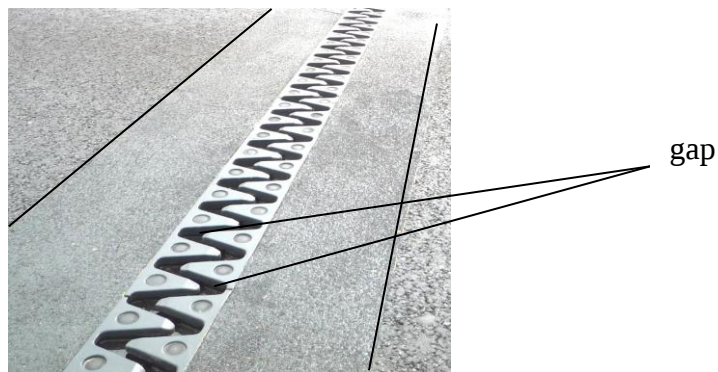
20. A bicycle pump is used to inflate a car tyre. The pressure, volume and temperature of the gas is measured during the inflation.

Mary says, "the pressure is constant and the volume increases because the temperature of the gas increases according to Charles' law."

John says, "the pressure of the gas decreases and the volume increases according to Boyle's law".

Which of the following is correct?

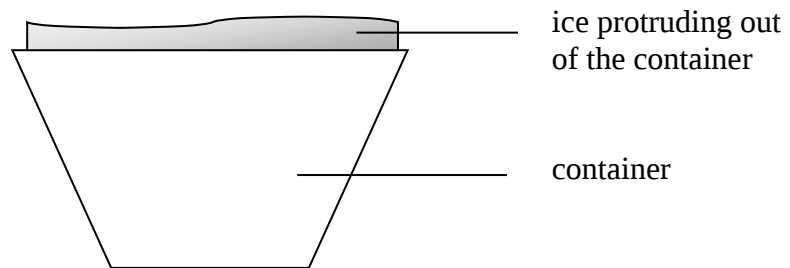
- A Mary is right.
 - B John is right.
 - C Mary and John are wrong.
 - D Mary and John are right at different times of the pumping.
21. The picture below shows a device placed between sections of a continuous floor usually exposed to the hot sun during the day. What is the purpose of the device?



Source: <http://magebar.ch>

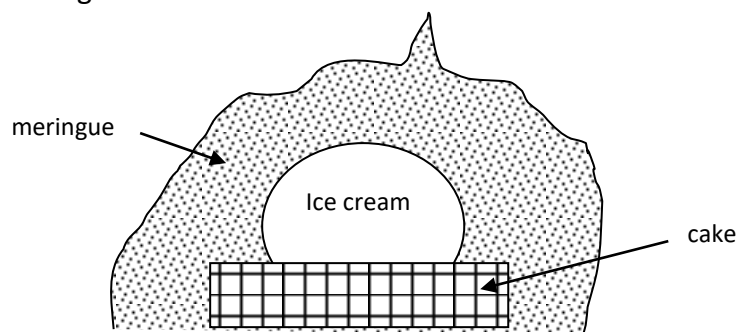
- A It is a hump along the floor to prevent speeding.
 - B It is a joint to prevent floor from cracking.
 - C It is a line to demarcate different parts of the building.
 - D It is a joint that allows wires and pipes to pass through.
22. Which of the following household items reduces heat loss by radiation?
- A a shiny kettle
 - B a black charger
 - C a sheep skin carpet
 - D a Styrofoam cup

23. A container fully filled with water to the brim was placed in the freezer at -2°C for a night and is brought out to room temperature. The diagram shows the container *immediately after* it is taken out of the freezer.



Which of the statement best describes the diagram above?

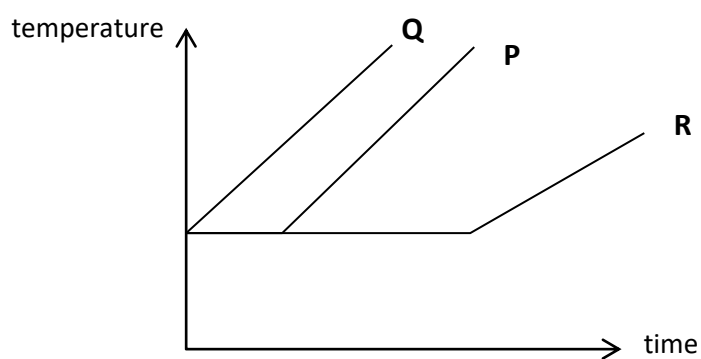
- A Water will over flow when the ice melts at 0°C .
 - B Water expands when cooled between 4°C to 0°C .
 - C Ice is expanding as temperature increases from -2°C to 0°C .
 - D Ice is contracting as temperature increases from -2°C to 0°C .
24. The diagram shows a type of dessert called “Baked Alaska”. The meringue (egg white that is whipped into a fluff) is baked in a hot convection oven till it is firm without melting the ice cream.



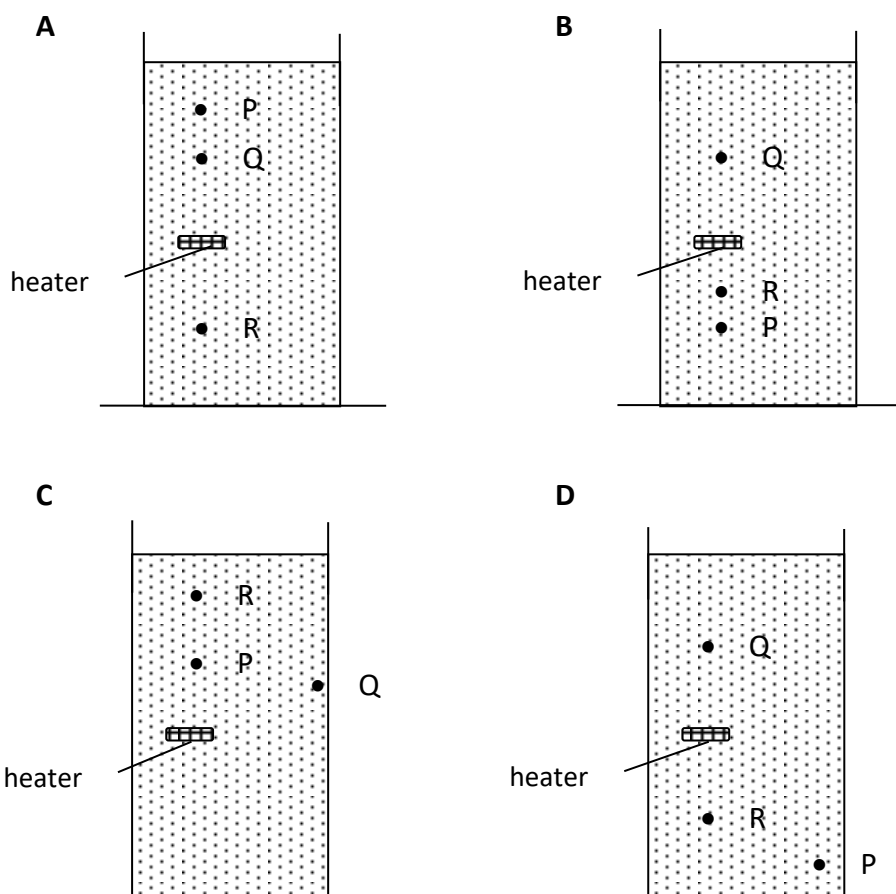
Which of the following describes the property of the meringue?

- A The thermal conductivity increases as it firms.
- B It is a poor conductor of heat.
- C It is a poor absorber of radiation.
- D It is a good reflector of radiation.

25. The diagram shows the temperature-time graph at points **P**, **Q** and **R** in a water bath that has an immersion heater that is switch on.

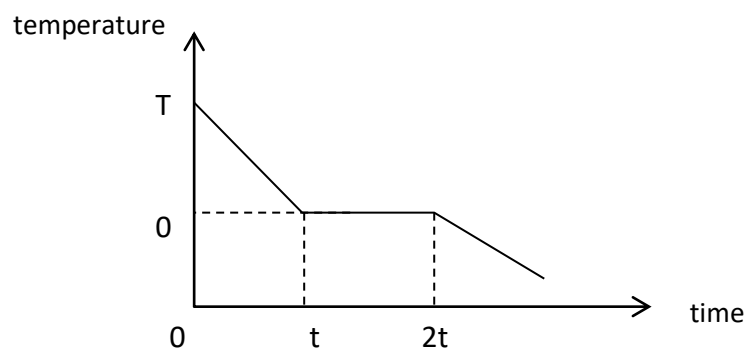


Which diagram correctly indicates the positions **P**, **Q** and **R** in the water bath?



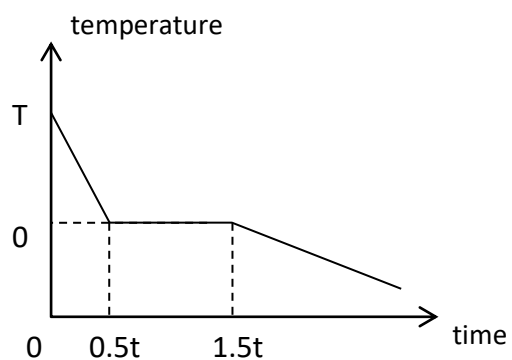
26. What is steam point?
- A** 100 °C
 - B** The temperature when water starts boiling
 - C** The range of temperature when pure water boils
 - D** The range of temperature before pure water boils
27. Thermocouple can respond quickly to temperature changes because its junction
- I** has high melting point.
 - II** has low specific heat capacity.
 - III** is a good thermal conductor.
- A** II only
 - B** II and III only
 - C** III only
 - D** I, II and III
28. A thermocouple indicates 0.20 mV at ice point and 3.00 mV at 500 °C. What is the temperature when the thermocouple indicates 3.70 mV?
- A** 180 °C
 - B** 480 °C
 - C** 630 °C
 - D** 680 °C
29. An object falls from a certain height. Which of the following factors will not affect the final temperature of the object?
- A** mass
 - B** specific heat capacity
 - C** initial temperature
 - D** height

30. The diagram shows how temperature of water changes as it is cooled.

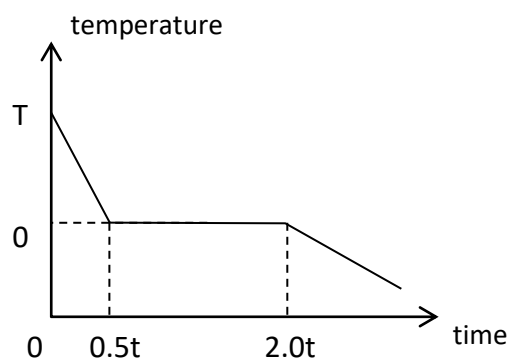


Which diagram shows the temperature changes of the same mass of water if thermal energy is removed at twice rate?

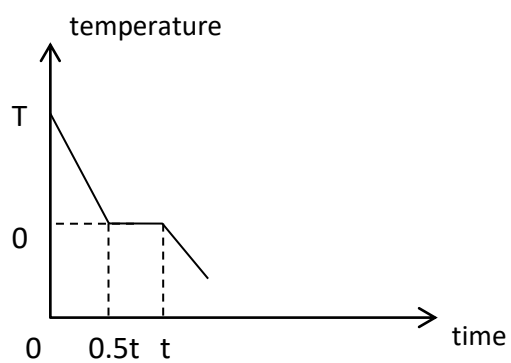
A



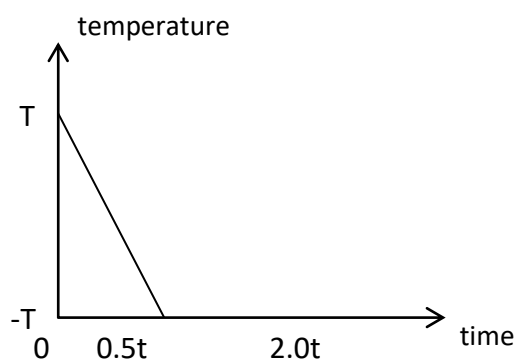
B



C



D



End of Paper