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TAMPINES SECONDARY SCHOOL

Secondary Four Normal Academic
PRELIMINARY EXAMINATION 2022

NAME					
CLASS				**REGISTER NUMBER**	

SCIENCE (PHYSICS) **5105/01**

Paper 1 Multiple Choice **01 August 2022**

Papers 1 and 2: 1 Hour 15 minutes

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

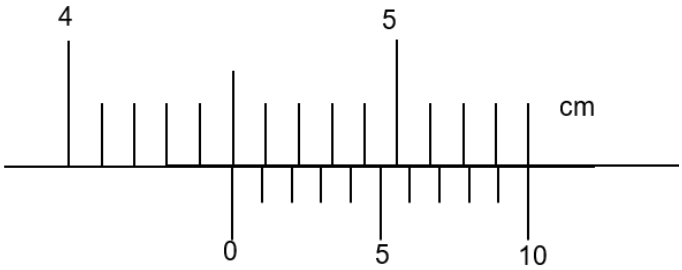
Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, class and register number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **twenty** 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 separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Answers to Paper 1 and Paper 2 must be handed in separately.
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
You are advised to spend no longer than **30 minutes** on **Paper 1**.
You may proceed to answer Paper 2 as soon as you have completed Paper 1.
Any rough working should be done in this booklet.
The use of an approved scientific calculator is expected, where appropriate.

1 What is the reading of the vernier callipers shown below?



A 4.40 cm

B 4.50 cm

C 5.40 cm

D 5.54 cm

2 What should be used to measure the thickness of a thread as accurately as possible?

A ruler

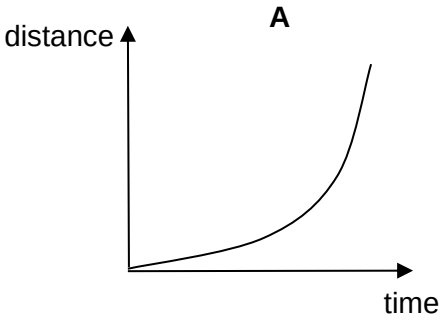
B measuring cylinder

C vernier calipers

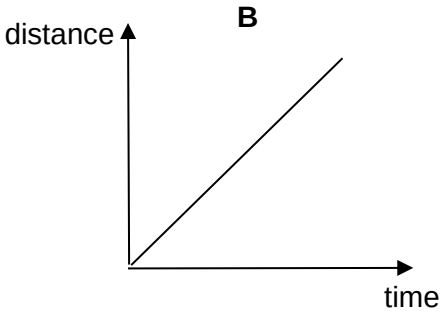
D micrometer screw gauge

3 Which of the following distance-time graphs shows that the speed of an object is increasing?

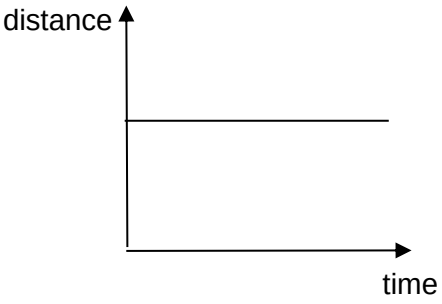
A



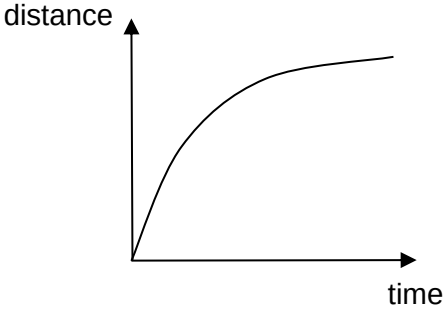
B



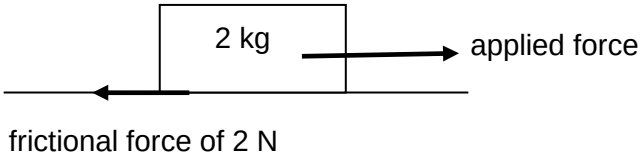
C



D



4 An experiment was conducted to investigate the friction between a moving wooden block and the horizontal, flat surface of a bench. The mass of the block is 2 kg while the frictional force on the bench is 2 N.



Which of the following statements best describes the acceleration of the block when the applied force is increased from 2 N to 10 N?

A The acceleration increases from 1 m/s^2 to 4 m/s^2.

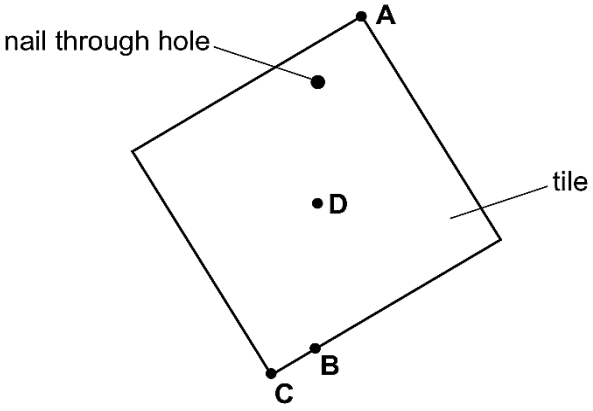
B The acceleration increases from 0 m/s^2 to 4 m/s^2.

C The acceleration decreases from 4 m/s^2 to 1 m/s^2.

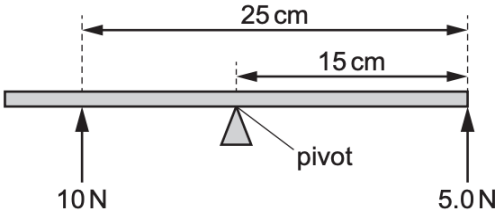
D The acceleration decreases from 4 m/s^2 to 0 m/s^2.

5 The diagram shows a squared-shaped tile hanging loosely on a nail.

Which of the following best indicate the centre of gravity of the tile?



6 A uniform beam is pivoted at its centre of mass. It is acted upon by two forces as shown.



What is the resultant moment about the pivot?

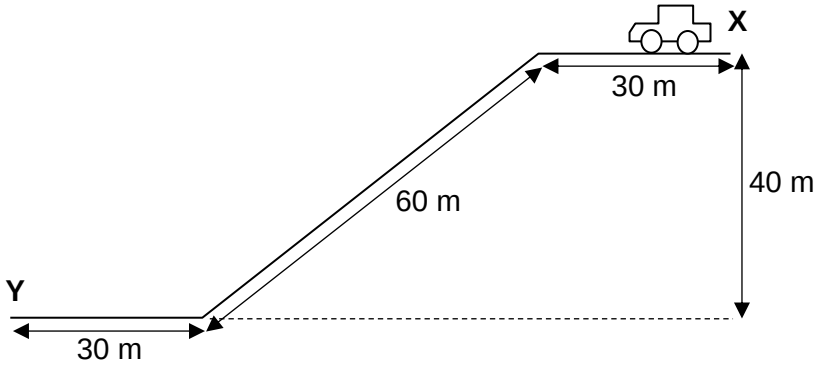
A 25 Ncm anti-clockwise

B 25 Ncm clockwise

C 175 Ncm anti-clockwise

D 175 Ncm clockwise

7 A car of mass 900 kg moves from point **X** to point **Y** along a section of level road, down a hill, and along another section of level road. The gravitational field strength, g is 10 N/kg. The diagram shows the distances moved.



What is the change in gravitational potential energy of the car in moving from point **X** to point **Y**?

A 180 000 J

B 360 000 J

C 540 000 J

D 1 080 000 J

8 Four students lift weights through equal distances. A coach records how long it takes for them to do 3 lifts each. The table shows the results.

student	weight lifted / N	time taken / s
A	45	5
B	45	10
C	90	5
D	90	10

Which student produces the most power?

9 Which of the following happens when a fixed mass of gas stored in a rigid container is heated?

A The density of the gas increases.

B The gas condenses.

C The volume of the gas increases.

D The average speed of the gas molecules increases.

10 Which of the following factors can increase the rate of evaporation of a liquid?

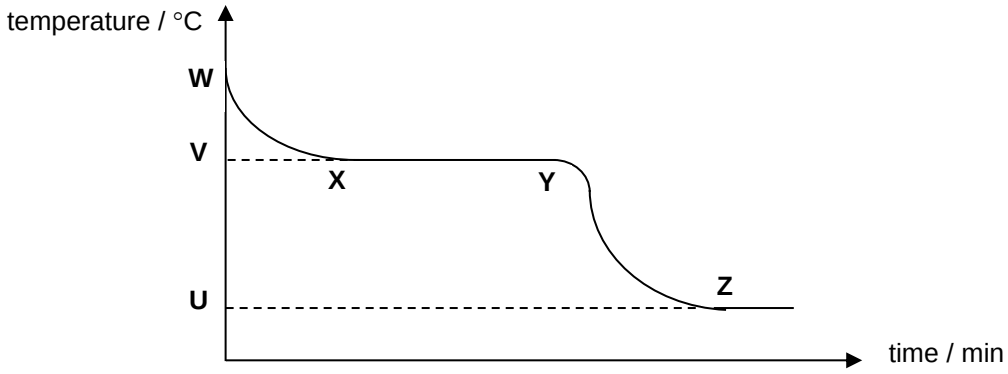
A increase the temperature of the liquid

B increase the external pressure

C increase the humidity of air outside

D decrease the surface area of the liquid

11 The following graph shows the cooling curve of a beaker of liquid.



Which section of the graph is the beaker containing a mixture of liquid and solid?

A **U** and **V**

B **W** and **X**

C **X** and **Y**

D **Y** and **Z**

12 Which of the following statements best describes a longitudinal wave?

A The particles are moving randomly.

B The particles are oscillating about a circular path.

C The particles are vibrating along the direction of wave travel.

D The particles are vibrating perpendicular to the direction of wave travel.

13 Gamma rays, microwaves and ultra-violet rays are all part of the electromagnetic spectrum.
What is the correct order of increasing wavelength?

	shortest wavelength	→	***longest wavelength***
A	gamma rays	ultra-violet rays	microwaves
B	gamma rays	microwaves	ultra-violet rays
C	microwaves	ultra-violet rays	gamma rays
D	ultra-violet rays	microwaves	gamma rays

14 Which component from the electromagnetic spectrum is used to help the human body to produce Vitamin D and to detect counterfeit money?

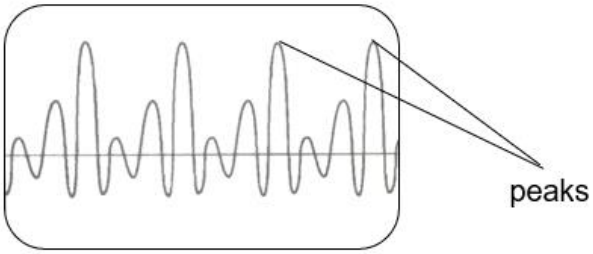
A ultra-violet rays

B radio waves

C infra-red radiation

D gamma rays

15 The diagram below shows a trace for a note emitted by a musical instrument.



If the same note is played again, but more loudly, how will the trace change?

A The peaks will be higher.

B The peaks will be lower.

C The peaks will be closer together.

D The peaks will be further apart.

16 A 2.0 m long wire with a cross-sectional area of 4.0 mm^2 has a resistance of 8.0 Ω.
What is the resistance of the same type of wire which is 8.0 m long and has a cross sectional area of 8.0 mm^2?

A 2.0 Ω

B 4.0 Ω

C 8.0 Ω

D 16.0 Ω

17 A current of 0.60 A flows through a light bulb.

What is the amount of charges flowing through the bulb in 10 seconds?

A 0.06 C

B 1.70 C

C 6.00 C

D 16.7 C

18 How much energy is used up by a 2.0 W bulb with 3.0 V voltage across it in one minute?

A 2.0 J

B 3.0 J

C 120 J

D 180 J

19 Why do we earth an electrical appliance?

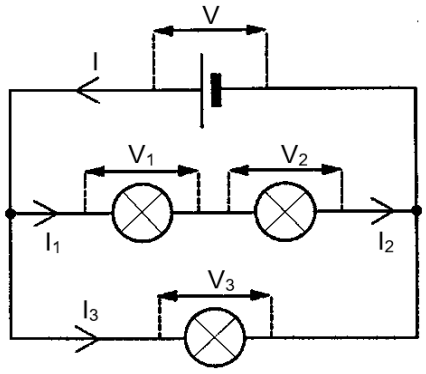
A To prevent the fuse from blowing.

B To prevent the power supply from overloading.

C To avoid having a current flowing through our body.

D To avoid excess current flowing through the appliance.

20 Three identical lamps and a cell are connected in a circuit as shown.



Which pair of equations is correct for this circuit?

	potential difference	current
A	$V_3 = V_1 + V_2$	$I = I_1 + I_2 + I_3$
B	$V = V_1 + V_2$	$I = I_1 + I_2$
C	$V = V_2 + V_3$	$I = I_1 + I_3$
D	$V = V_3$	$I = I_2 + I_3$