CHINIOT ISLAMIA PUBLIC SCHOOL AND COLLEGE

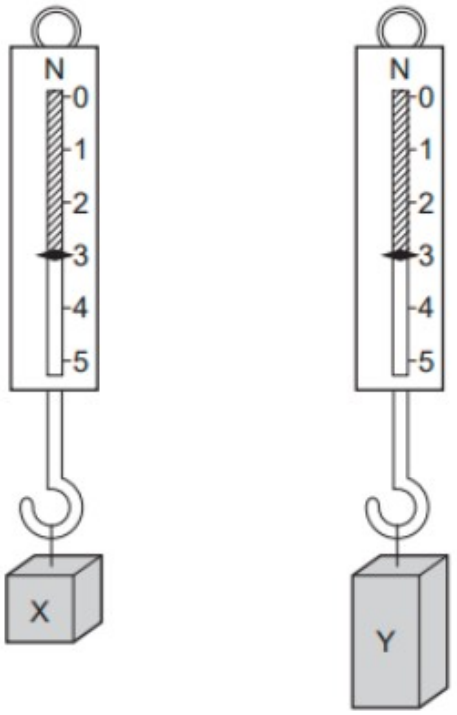
1ST QUARTERLY TEST

First Quartely Test - OI Physics

Name: _____	Section: _____	Roll No: _____

Duration: 2 Hours **Total Marks: 100**

1. Two blocks of metal X and Y hang from spring balances, as shown in the diagrams.



What does the diagram show about X and Y?

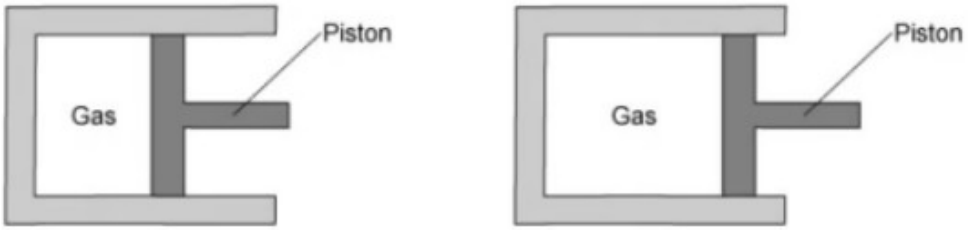
★ (a) They have the same mass and the same volume but different weights.

★ (b) They have the same mass and the same weight but different volumes.

★ (c) They have the same mass, the same volume and the same weight.

★ (d) They have the same weight and the same volume but different masses.

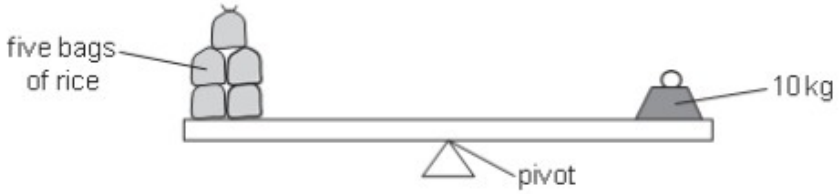
2. A sealed piston is used to expand a gas. No gas escapes during the process.



What happens to both the density of the gas and to its pressure when it is expanded in this way?

	Density	Pressure
A	stays the same	stays the same
B	increases	decreases
C	decreases	stays the same
D	decreases	decreases

3. Five identical bags of rice are balanced on a uniform beam by an object of mass 10 kg.



Two more identical bags of rice are added to the other five. The average position of the bags on the beam does not change. What mass now balances the bags?

★ (a) 3.5 kg

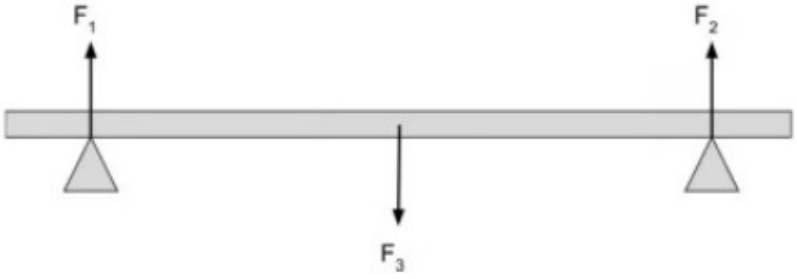
★ (b) 7.0 kg

★ (c) 12 kg

★ (d) 14 kg

4. A small cylinder is rolled along a ruler and completes two full turns as shown in the diagram.

5. A plank rests on two supports, as shown in the diagram. The plank is in equilibrium. Three forces act on the plank.



Which statement is true?

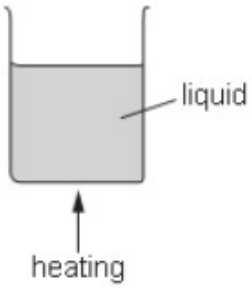
★ (a) The upward force is larger than the downward force.

★ (b) The resultant force on the beam is zero and the resultar moment on the beam is zero.

★ (c) The resultant moment on the beam is zero, but the resultant force is not zero.

★ (d) All three forces are equal in size

6. A liquid is heated in a beaker.



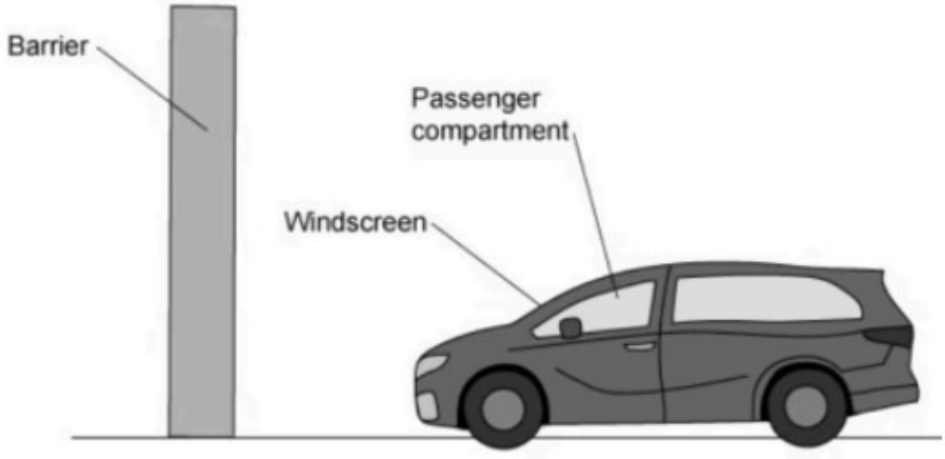
The density of the liquid changes as its temperature increases. This causes energy to be transferred throughout the liquid. How does the density change and what is this energy transfer process?

	density	energy transfer process
A	decreases	conduction
B	decreases	convection
C	increases	conduction
D	increases	convection

7. Four different electric bicycles are driven along a road. The work done by their motor, and the time taken to do that work is shown in the table below. Which of the electric bicycles produces the most power?

	Work done / J	**Time taken / s**
A	10 000	20
B	20 000	40
C	400 000	400
D	2000	1

8. A passenger of mass 90 kg is involved in a minor car crash.



The car approaches a solid barrier at 32 m/s. It crashes into the barrer and stops in 0.2s. Determine the impulse that must be applied to the car to bring it to rest.

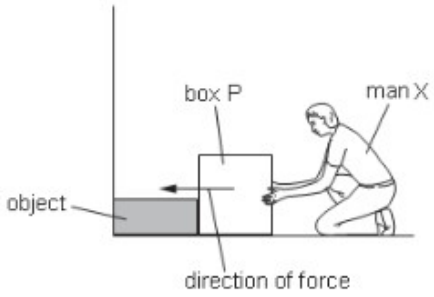
★ (a) 2.8 Ns

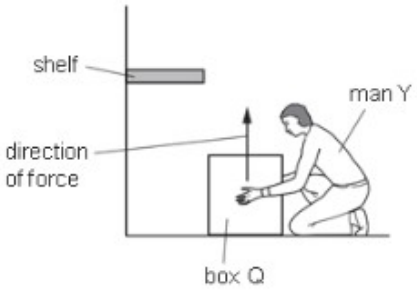
★ (b) 14 Ns

★ (c) 580 Ns

★ (d) 2900 Ns

9. **3** In a factory, two men X and Y try to move identical heavy boxes P and Q. Man X tries to push box P along the floor. The box does not move because an object is in the way. Man Y lifts box Q from the floor onto a shelf.





Which man does the most work on the box, and which box gains the most energy?

	man doing most work	box gaining most energy
A	X	P
B	X	Q
C	Y	P
D	Y	Q

10. Which of the following processes take place in a non-metal to allow the conduction of thermal energy?

	Transfer of electrons	**Lattice vibrations**	**Transfer of nuclei**
A	yes	yes	no
B	no	yes	no
C	yes	yes	yes
D	no	yes	yes

11. A cyclist travels down a hill from rest at point X, without pedalling. The cyclist applies his brakes and the cycle stops at point Y.

Which energy changes have taken place between X and Y?

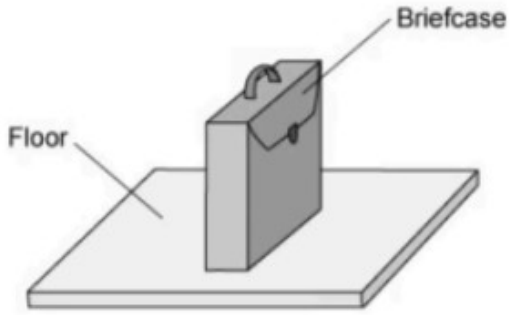
★ (a) gravitational potential → kinetic → thermal (heat)

★ (b) gravitational potential → thermal (heat) → kinetic

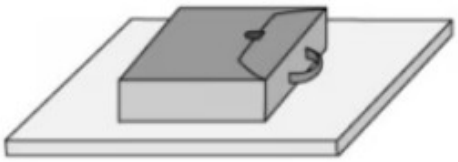
★ (c) kinetic → gravitational potential → thermal (heat)

★ (d) kinetic → thermal (heat) → gravitational potential

12. A briefcase, with flat, rectangular sides rests on the floor as shown in the diagram.



The briefcase is now turned so that it rests with its large, flat side on the floor.



How has the change affected the force on the floor, and the pressure exerted by the briefcase on the floor?

	Force	Pressure
A	unchanged	decreased
B	unchanged	unchanged
C	decreased	decreased
D	decreased	unchanged

13. The Sun is the source of the majority of the energy on Earth. How does thermal energy from the Sun travel to the Earth?

★ (a) By conduction, convection and radiation.

★ (b) By conduction and convection only.

★ (c) By convection and radiation only.

★ (d) By radiation only.

14. A planet orbits a star at a constant speed in a circular orbit. Which of the statements below, about the force needed to maintain this motion, is correct?

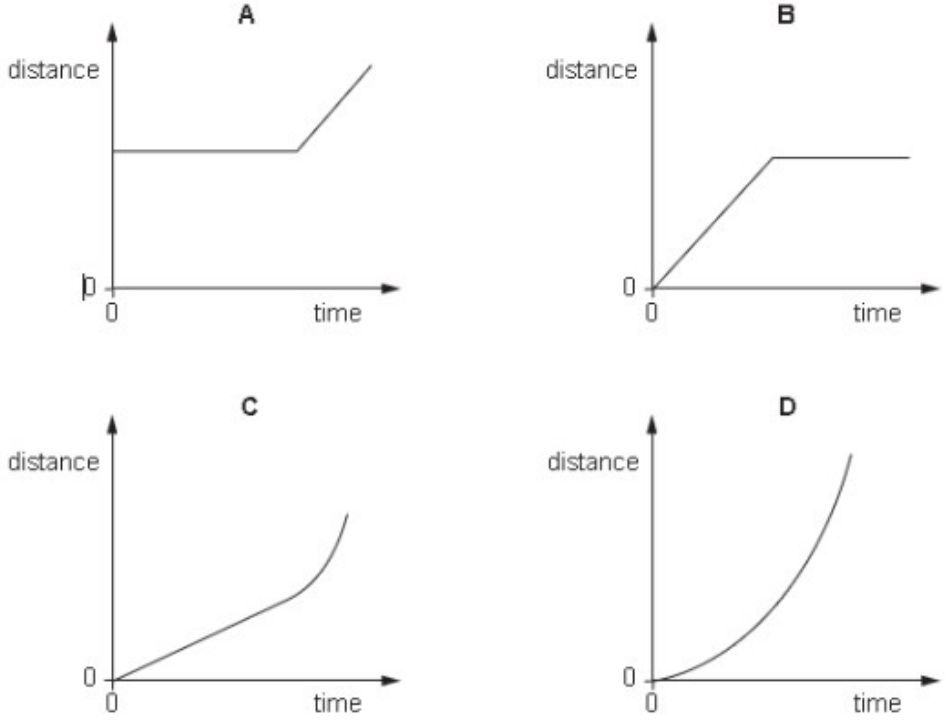
★ (a) No force is required

★ (b) The force is directed away from the centre of the circle

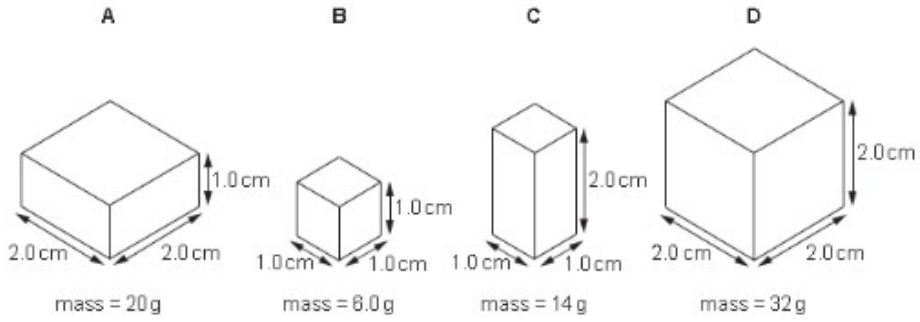
★ (c) The force is directed in the direction the planet is travelling

★ (d) The force is directed towards the centre of the circle

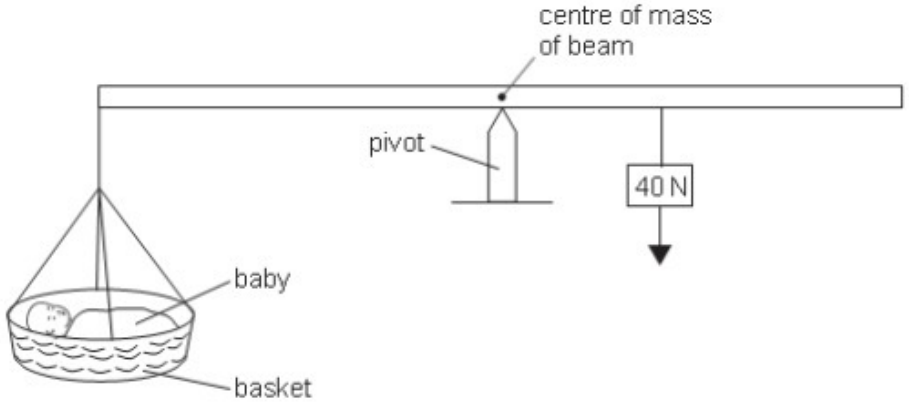
15. An object moves at a constant speed for some time, then begins to accelerate. Which distance-time graph shows this motion?



16. The diagrams show the dimensions and masses of four regular solid objects. The objects are made from different metals. Which metal has the greatest density?



17. The diagram shows a balance being used to find the weight of a baby. The weight of the basket can be ignored. At equilibrium, the pivot is nearer to the 40 N balancing weight than to the baby.



What is the weight of the baby?

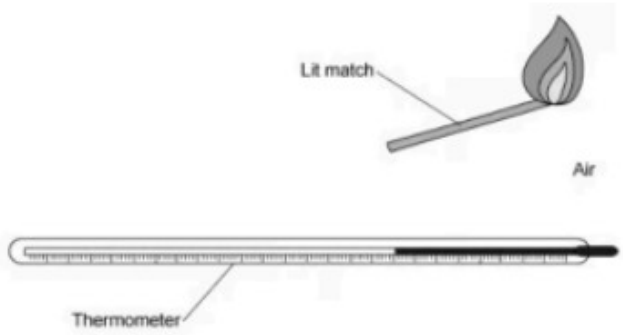
★ (a) less than 40 N

★ (b) 40 N

★ (c) more than 40 N

★ (d) impossible to tell without a scale on the beam

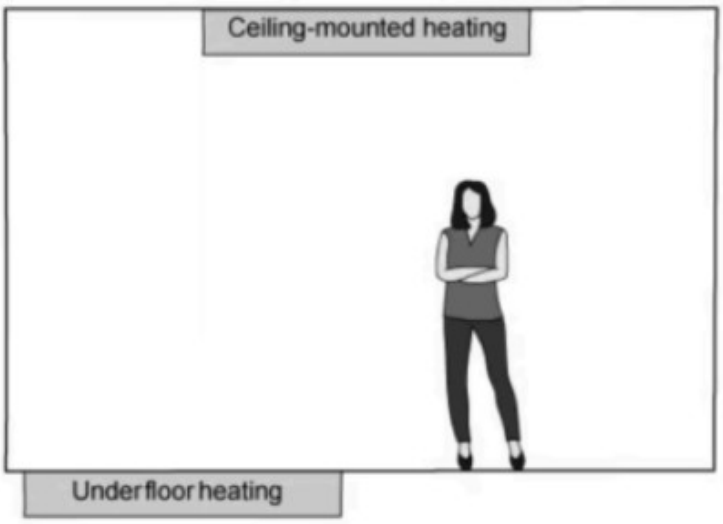
18. A lit match is placed above a thermometer.



Which row in the table shows how the thermal energy from the lit match reaches the thermometer?

	Convection	Conduction	Radiation
A	yes	yes	yes
B	yes	yes	no
C	no	yes	yes
D	no	no	yes

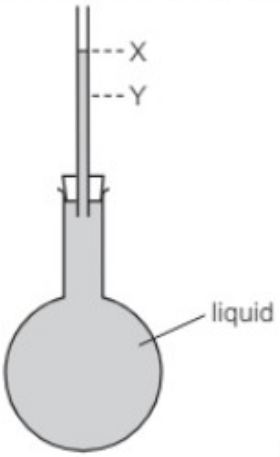
19. In modern housing, it is convenient to locate heaters so they are not on the walls, taking up valuable wall space for furniture. Other than wall-mounted radiators, two other options would be viable: ceiling heaters or underfloor heaters.



Which of the two options would heat the room more effectively and why?

	Option	Explanation
A	ceiling-mounted	hot air is more dense and falls
B	ceiling-mounted	hot air is less dense and falls
C	underfloor	hot air is less dense and rises
D	underfloor	hot air is more dense and rises

20. A liquid at room temperature fills a flask and a glass tube to level X.



The flask is now placed in ice, and the liquid level in the tube falls to level Y. Why does the level fall?

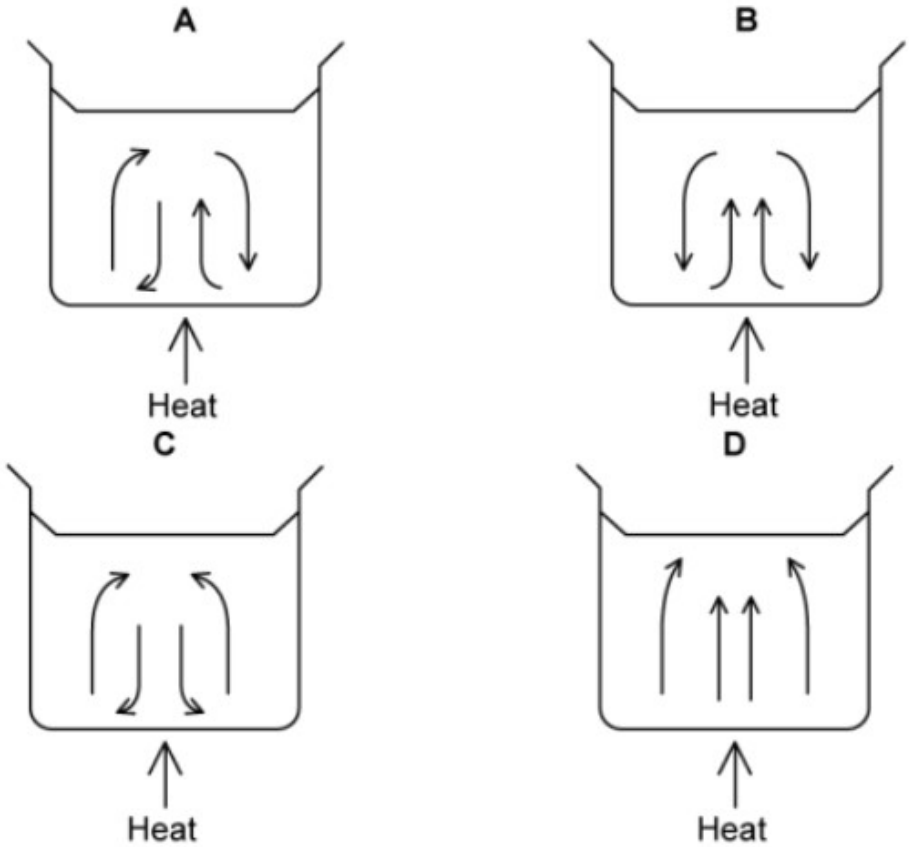
★ (a) The flask contracts.

★ (b) The flask expands.

★ (c) The liquid contracts.

★ (d) The liquid expands.

21. Which diagram correctly shown the motion of particles in a beaker filled with liquid heated from the base?



22. 1 A cotton sheet is ironed with a hot electric iron. How is energy transferred through the metal base of the iron to the sheet?

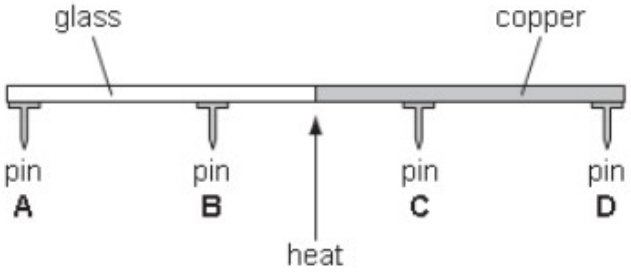
★ (a) by conduction only

★ (b) by convection only

★ (c) by radiation only

★ (d) by convection and radiation only.

23. A rod is made half of glass and half of copper. Four pins A, B, C and D are attached to the rod by wax. The rod is heated in the centre as shown. The pins fall off when the wax melts. Which pin falls off first?



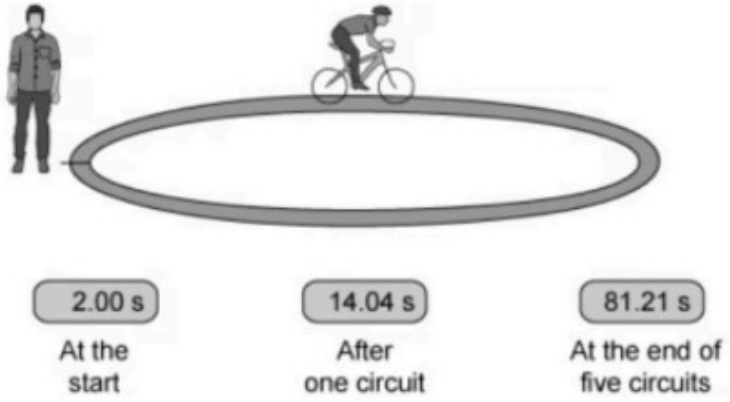
24. Of the following modes of thermal energy transfer, which one transfers energy at the greatest speed?

★ (a) Conduction
★ (b) Convection
★ (c) Radiation
★ (d) Evaporation

25. Electrical energy may be obtained from nuclear fission. In which order is the energy transferred in this process?

★ (a) nuclear fuel → generator → reactor and boiler → turbines
★ (b) nuclear fuel → generator → turbines → reactor and bo
★ (c) nuclear fuel → reactor and boiler → generator → turbines
★ (d) nuclear fuel → reactor and boiler → turbines → genera

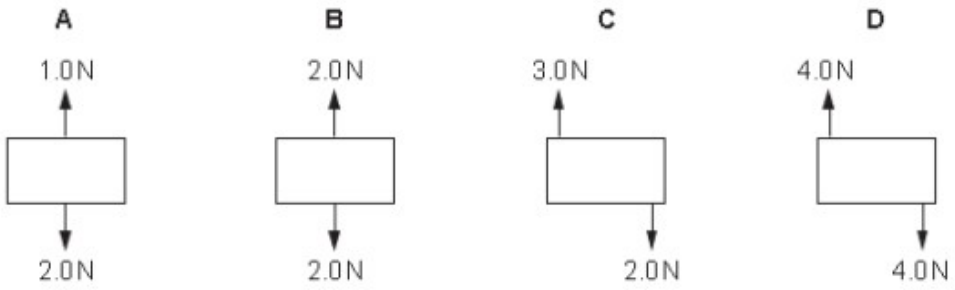
26. An Olympic cyclist rides round a velodrome track 5 times. The diagram below shows the reading on the stopwatch which was used to time the laps. Unfortunately, the person using the stopwatch started it a little early.



What is the average time to complete one lap of the velodrome?

★ (a) 16.24 s
★ (b) 14.04 s
★ (c) 15.84 s
★ (d) 15.21 s

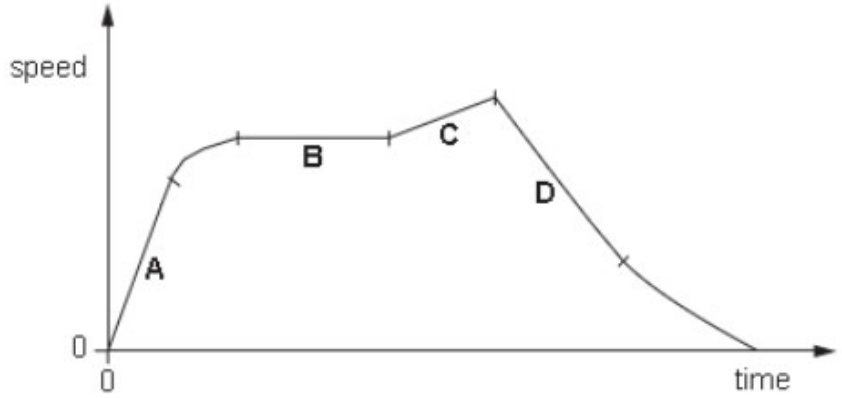
27. 1 Four objects are each acted on by only two forces, as shown. Which object is in equilibrium?



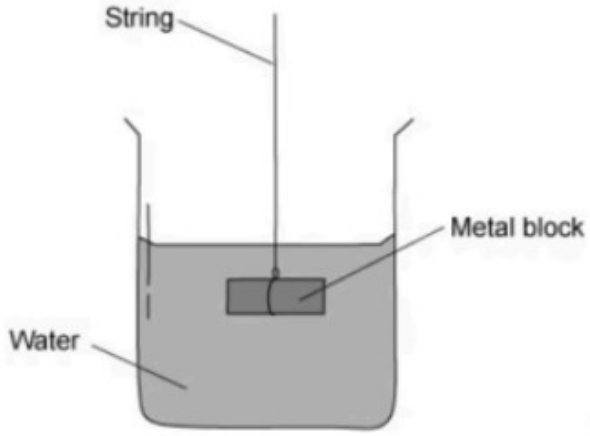
28. A sealed yet empty (except for air) plastic drinks bottle is left outside in the sunshine on a warm day. Which row of the table correctly describes what happens to the average speed of the air molecules, and to the pressure inside the bottle?

	Average speed of particles	Pressure inside bottle
A	increases	increases
B	increases	decreases
C	decreases	increases
D	decreases	decreases

29. 1 A car travels along a straight road. The speed-time graph for this journey is shown. During which labelled part of the journey is the resultant force on the car zero?



30. A small metal block is suspended under the surface of a beaker of water by a string. The metal block experiences a pressure exerted by the liquid.



What would increase the pressure exerted on the metal block?

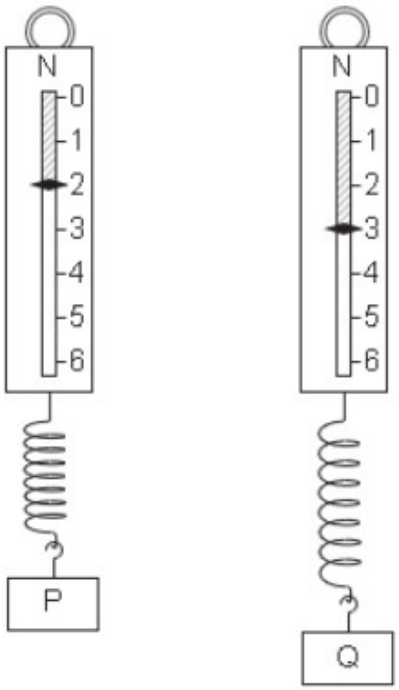
★ (a) increasing the surface area of the stone.

★ (b) using a liquid with a lower density.

★ (c) increasing the mass of the metal block.

★ (d) lowering the metal block deeper into the liquid.

31. Two metal blocks P and Q have identical dimensions. They hang on identical spring balances.



What can be deduced about P and Q?

★ (a) A. They have different volumes and different weights.

★ (b) B They have different volumes, but equal masses.

★ (c) C They have equal volumes and equal weights.

★ (d) D They have equal volumes, but different masses.

32. Which of the following terms and equations are equivalent to the change in an object's momentum?

	Term	Equation
A	Force	$F = \frac{I}{t}$
B	Impulse	$I = Ft$
C	Force	$F = ma$
D	Impulse	$I = \frac{\Delta p}{t}$

33. Which of the following energy transfers is most efficient?

★ (a) Useful energy out = 70%

★ (b) Wasted energy out = 45%

★ (c) Useful energy out = 35%

★ (d) Wasted energy out = 25%

34. 1 . An experiment is carried out to measure the extension of a rubber band for different loads. The results are shown below.

load / N	0	1.0	2.0	3.0
length / cm	15.2	16.2		18.6
extension / cm	0	1.0	2.1	3.4

Which figure is missing from the table?

★ (a) 17.2

★ (b) 17.3

★ (c) 17.4

★ (d) 17.6

35. A liquid is evaporating. The liquid is not boiling. Which statement about the liquid is correct?

★ (a) Any molecule can escape, and from any part of the liquid.

★ (b) Any molecule can escape, but only from the liquid surface.

★ (c) Only molecules with enough energy can escape, and only from the liquid surface.

★ (d) Only molecules with enough energy can escape, but fr any part of the liquid.

36. Padded dashboards in cars are safer in an accident than non-padded ones because a passenger hitting the dashboard would experience

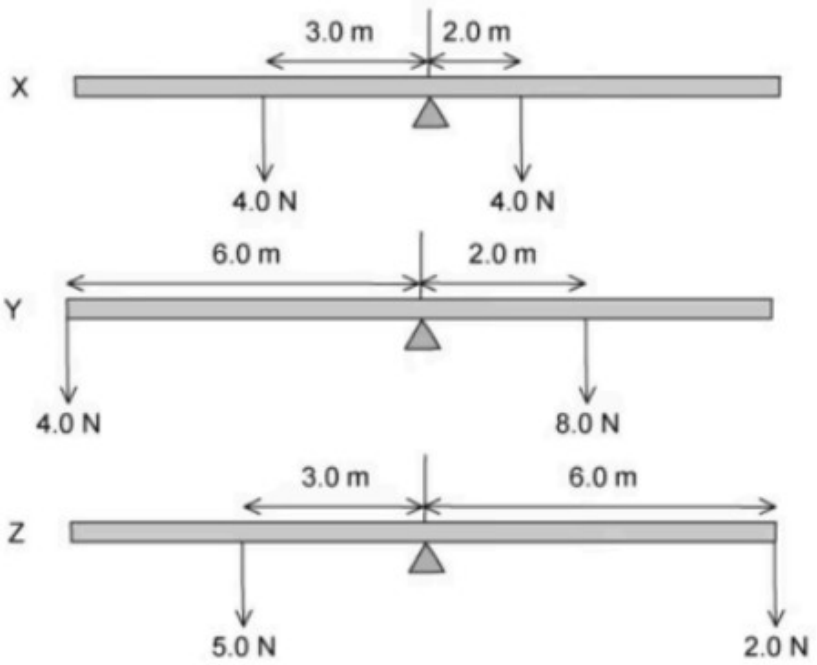
★ (a) Lengthened time of contact

★ (b) Shorter time of contact

★ (c) Decreased impulse

★ (d) Increased momentum

37. The diagrams below show three beams, each is pivoted at the centre. Each beam also has two forces acting on it, as shown.



Which of the beams will rotate clockwise?

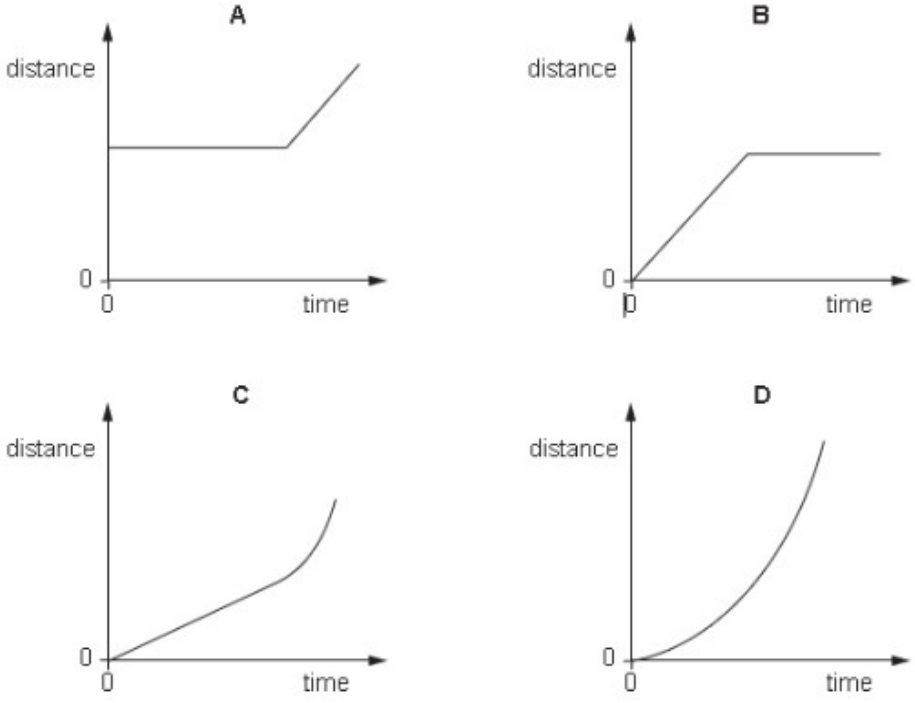
★ (a) X and Y

★ (b) Y and Z

★ (c) Z only

★ (d) None of them

38. An object moves at a constant speed for some time, then begins to accelerate. Which distance-time graph shows this motion?



39. Which of these is the correct definition for momentum and its unit?

	Definition	Unit
A	$p = m \div v$	N/m
B	$v = p \times m$	kgm/s
C	$v = p \div m$	kgm/s
D	$p = m \times v$	N/kg

40. When the temperature of a substance increases, there is also an increase in

★ (a) gravitational potential energy.

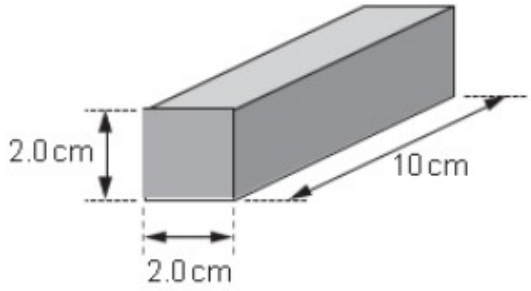
★ (b) specific heat capacity.

★ (c) mass.

★ (d) internal energy.

41. 1 The diagram shows a cuboid block made from a metal of density 2.5 g / cm^3.

42. 1 The diagram shows a cuboid block made from a metal of density 2.5 g / cm^3.



What is the mass of the block?

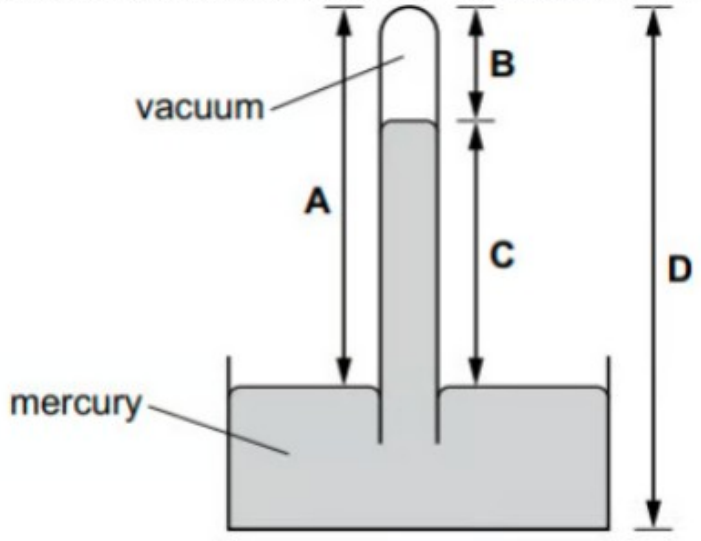
★ (a) 8.0 g

★ (b) 16 g

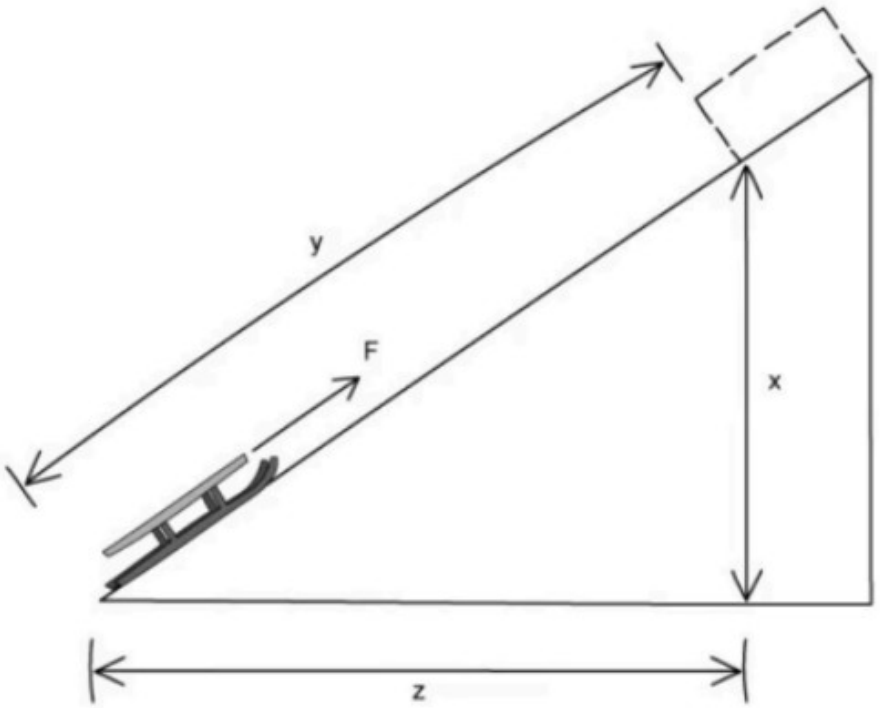
★ (c) 50 g

★ (d) 100 g

43. Mercury is a liquid. The diagram shows a simple mercury barometer. Which height is a measure of the atmospheric pressure?



44. A sledge is pushed up a hill with a force, F.



The work done on the sledge depends on the force applied and on a distance moved. Which distance?

★ (a) x

★ (b) y

★ (c) z

★ (d) x + z