

PHYSICS (4531/1) NAME: CLASS:

PAPER 1

August

2022

1 $\frac{1}{4}$ hours



TUN GHAFAR BABA MARA JUNIOR SCIENCE COLLEGE
JASIN, MALACCA

FINAL SEM 1, 2022 FORM 5

PHYSICS PAPER 1

One hour and fifteen minutes

DO NOT OPEN THIS BOOKLET UNLESS YOU ARE TOLD TO DO SO

1. This question paper consists of: **Paper I**
2. Answer **all** questions.
3. Figures shown are intended to provide useful information to answer that particular question.
Figures are not drawn to scale unless stated.
4. Usage of non-programmable calculator is allowed.

The following information may be useful. The symbols have their usual meaning.

1. $F = ma$	6. $P = \rho gh$	11. $E = \frac{F}{Q}$	16. $E = V + Ir$
2. $W = mg$	7. $P = \frac{F}{A}$	12. $I = \frac{Q}{t}$	17. $P = IV$
3. $F = kx$	8. $F_b = \rho Vg$	13. $V = \frac{E}{Q}$	18. $P = \frac{E}{t}$
4. $Ep = \frac{1}{2} Fx$	9. $g = 9.81 \text{ ms}^{-2}$	14. $V = IR$	19. $E = \frac{F}{d}$
5. $Ep = \frac{1}{2} kx^2$	10. $\frac{F_1}{A_1} = \frac{F_2}{A_2}$	15. $R = \frac{\rho l}{A}$	

The best way to predict the FUTURE is to CREATE it.

Peter Drucker

PAPER 1
OBJECTIVE QUESTIONS

Answer **all** questions.

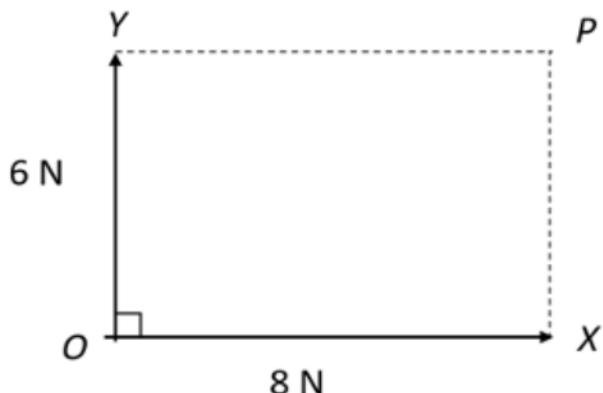
Each question is followed by three and four alternative answers A, B, C and D.

Choose the best option for each question then blacken the correct space on the answer sheet.

1 Which statement describes force accurately?

- A** Force is a scalar quantity.
- B** Force cannot change the speed of the object
- C** A balanced force causes a stationary object not to move
- D** Force cannot change the direction of motion of the object

2 Diagram 1 shows two forces, 6 N and 8 N, act at right angle at point O.



What is the magnitude and direction of the resultant of these two forces?

	Magnitude	Direction
A	10 N	OP
B	10 N	XY
C	14 N	OP
D	14 N	XY

3 Diagram 2 shows a trolley and a load connected by inelastic string through a frictionless pulley. The surface of the table has frictional force, R .

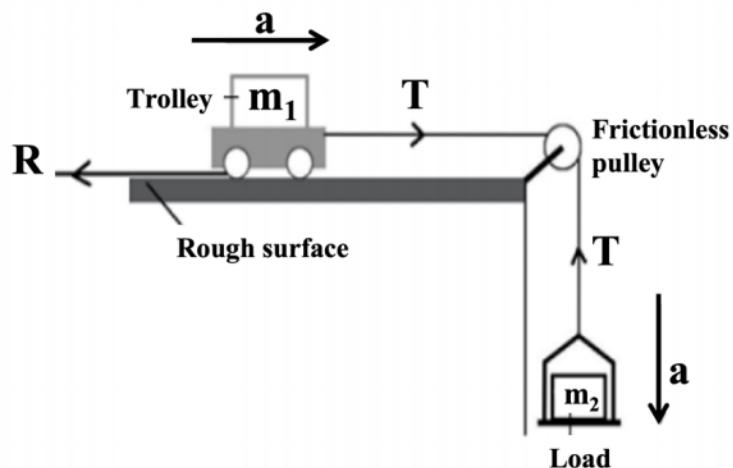


Diagram 2

Based on Diagram 2, resultant force that act on m_1 is

I	$R - m_1g$
II	$m_1g - R$
III	$T - R$
IV	$R - T$

A I and III
B II and III

C III only
D IV only

4 Diagram 3 shows a man are pulling a sledge with a rope.

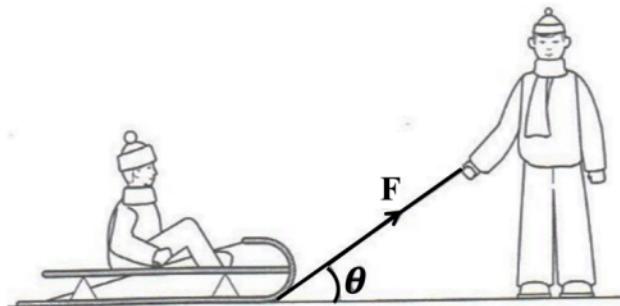


Diagram 3

Which of the following modification will move the sledge forward with maximum acceleration?

A Big F with small θ
B Big θ with small F

C Big F with big θ
D Small F with small θ

5 Diagram 4 shows a boy sitting on a chair. The weight of the boy, W acts vertically downward.



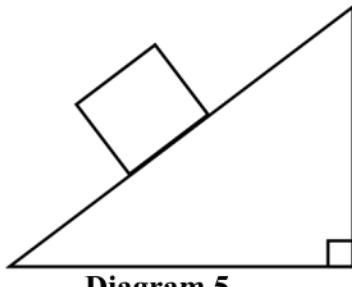
Diagram 4

Name the force, R that balanced the weight, W .

A Frictional force
B Resistance

C Normal force
D Impulsive force

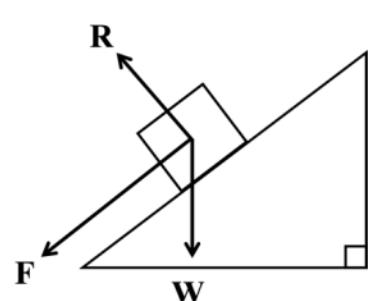
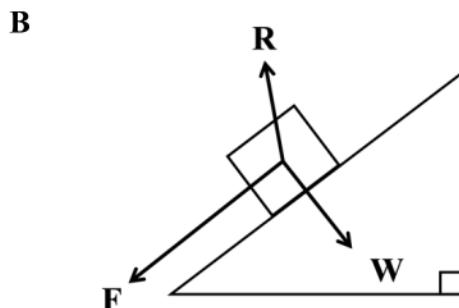
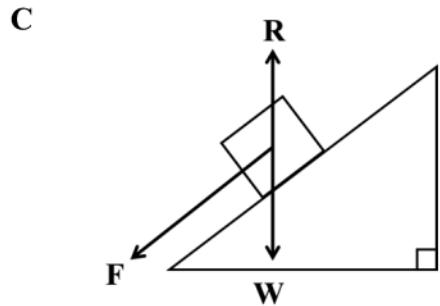
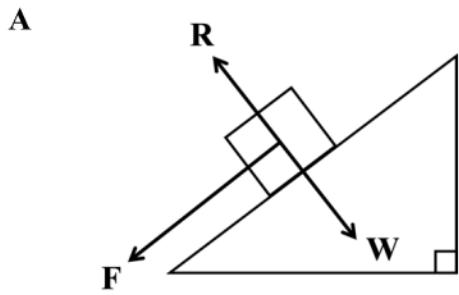
6 Diagram 5 shows a wooden block on an inclined plane.



Keyword:
 R = Normal reaction
 W = Weight
 F = Force parallel to the plane

Diagram 5

Which diagram shows the correct forces acting on the wooden block?



7 Diagram 6 shows a boy and a girl push a box, but the box remains stationary.

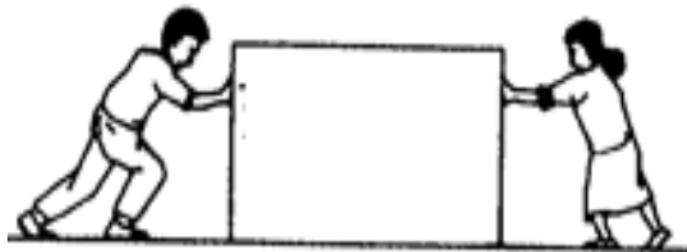


Diagram 6

This situation happens because

A the existence of net force
B the forces are in equilibrium
C the weight of the boy and girl is same
D the normal reaction acts to the box are zero

8 Diagram 7 shows three forces, P, Q, and R acting on a brick. The brick moves with a deceleration, in the direction shown.

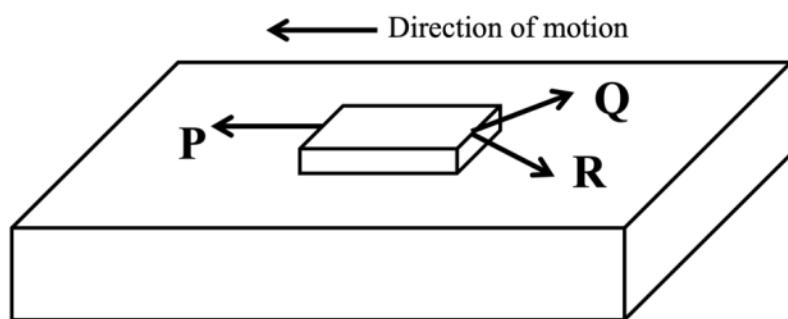


Diagram 7

Which is **correct** about the forces?

A $P = Q + R$
B $P > Q + R$
C $P < Q + R$

9 Diagram 8 shows three forces X, Y and Z acting on an object O. The object is in equilibrium state.

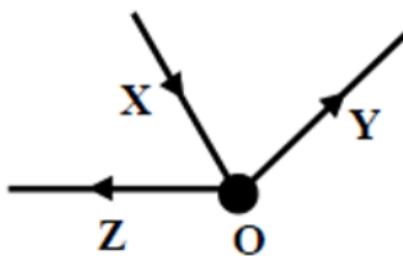
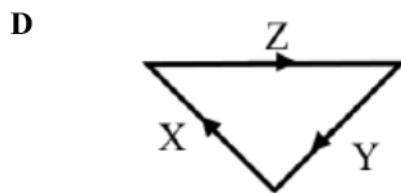
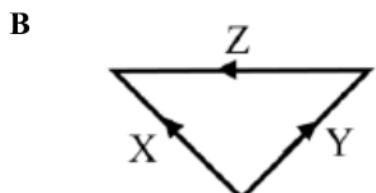
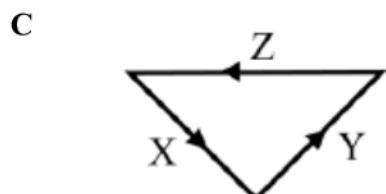
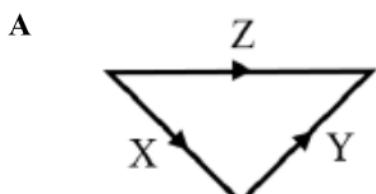


Diagram 8

Which diagram is **correct** triangle of forces?



10 Diagram 9 shows load M supported by three identical springs P, Q and R with different arrangement.

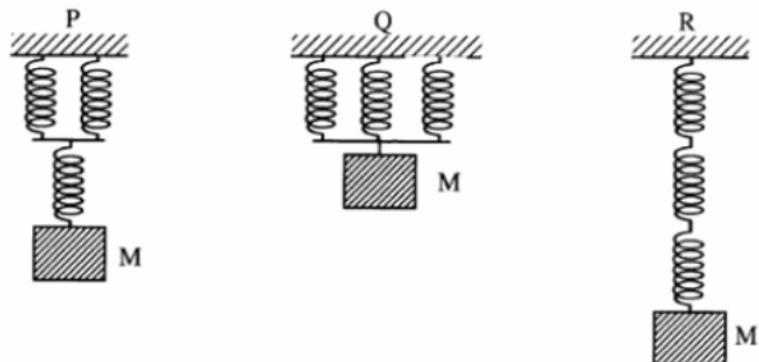


Diagram 9

Which comparison is **correct** about total extension of spring arrangement P, Q and R?

A P > R > Q
B Q > P > R

C R > Q > P
D R > P > Q

11 Diagram 10 shows the graph force, F applied to spring against extension, x .

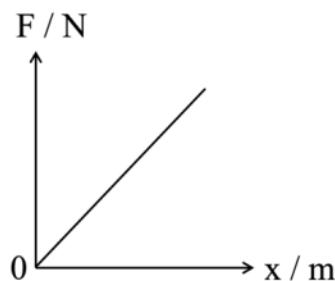


Diagram 10

Which of the following related to the graph.

	Gradient	Area under the graph
A	Elastic potential energy	Spring constant
B	Spring constant	Elastic potential energy
C	Spring elasticity	Forces in the spring
D	Forces in the spring	Spring elasticity

12 Diagram 11 shows a graph of force, F , against the extension, x , for springs R and S.

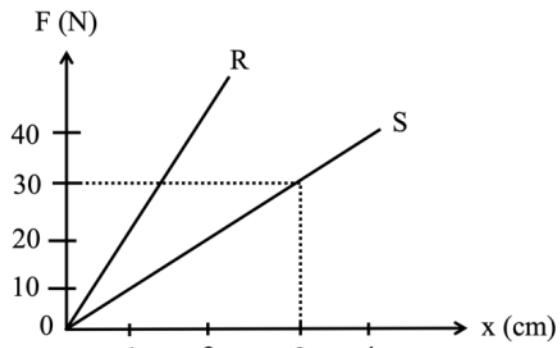
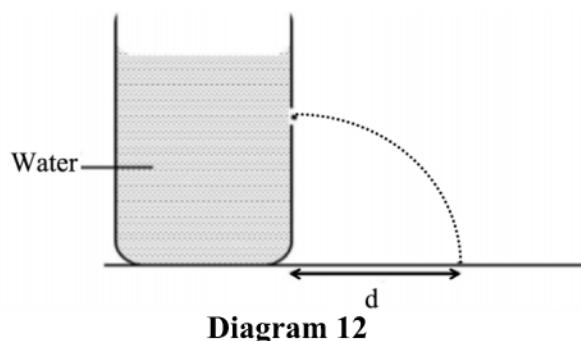


Diagram 11

What is the conclusion derived from the graph?

- A Spring R is longer
- B The wire of the coils of spring R is thicker
- C Both springs are made of the same material
- D The diameter of the coils of spring R is bigger

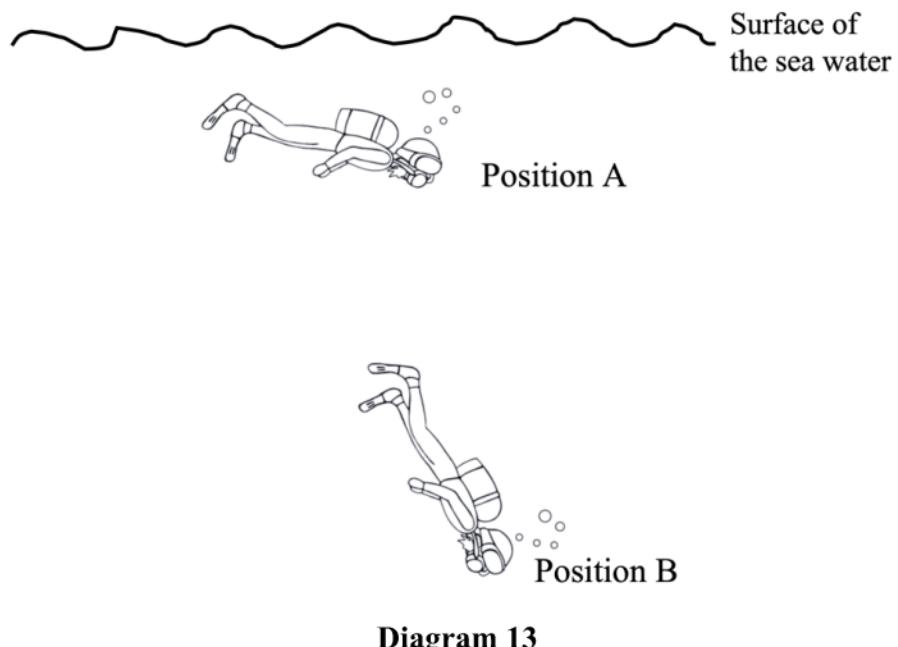
13 Diagram 12 shows water spurting out from a hole of a container at a horizontal distance, d .



When the level of the water decreases, what will happen to the horizontal distance, d ?

- A Increases
- B Decreases
- C Unchanged

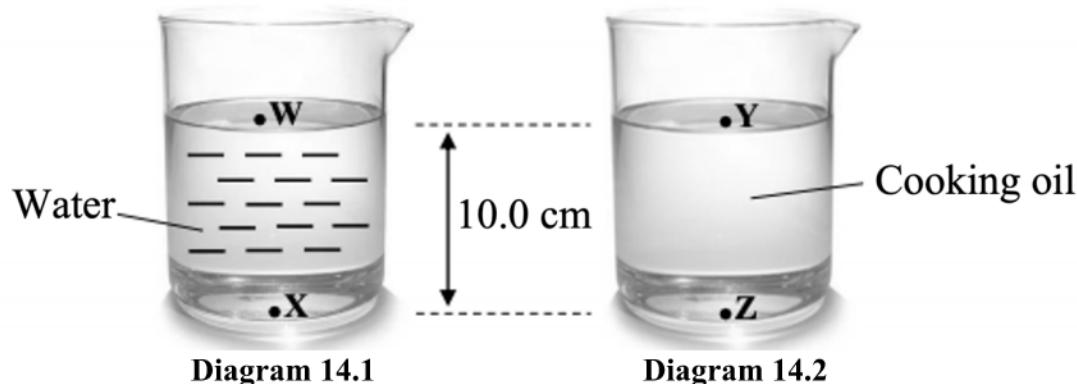
14 Diagram 13 shows a diver which change his position from A to B.



At position B, he experiences ear pain. This phenomenon occurs because

- A his body is in vertical position at B
- B he moves too fast from A to B
- C lack of oxygen at B
- D he dives deeper

15 Diagram 14.1 shows two points W and X in water.
Diagram 14.2 shows two points Y and Z in cooking oil.



Which comparison is **correct** about the liquid pressure, P ?

A $P_X > P_W > P_Z > P_Y$	C $P_X > P_Z; P_W = P_Y$
B $P_X > P_Z > P_W > P_Y$	D $P_X = P_Z; P_W = P_Y$

16 Which of the following is **not** a measurement of atmospheric pressure?

A 76 cm Hg	C $1 \times 10^5 \text{ N}$
B 10.3 m H ₂ O	D 1 bar

17 Diagram 15 shows a boy sucking an empty packet drink.



Diagram 15

Which statement describes this situation?

A Pressure inside the drink packet < the atmospheric pressure
B Pressure inside the drink packet > the atmospheric pressure
C Pressure inside the drink packet = the atmospheric pressure

18 Diagram 16 shows a cardboard and a glass of water.

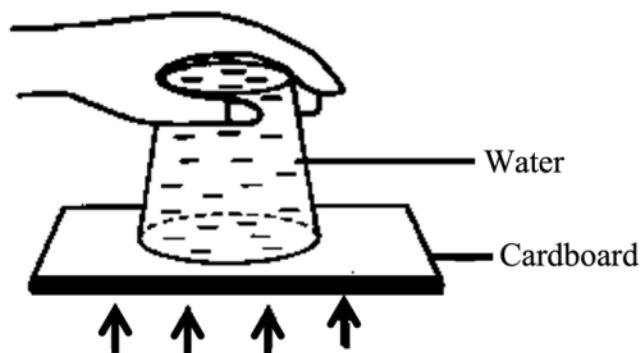


Diagram 16

When the hand is released, water does not flow out from the glass. What physics concept involved in the above situation?

A	Pressure	C	Liquid pressure
B	Gas pressure	D	Atmospheric pressure

19 The gas pressure in the container is due to the collision of the gas molecules with walls. Which change will increase the gas pressure?

- A** Decrease the gas temperature.
- B** Decrease the mass of container.
- C** Increase the volume of container.
- D** Increase the average velocity of gas molecules.

20 Diagram 17 shows a diver releasing air bubbles as he dives.

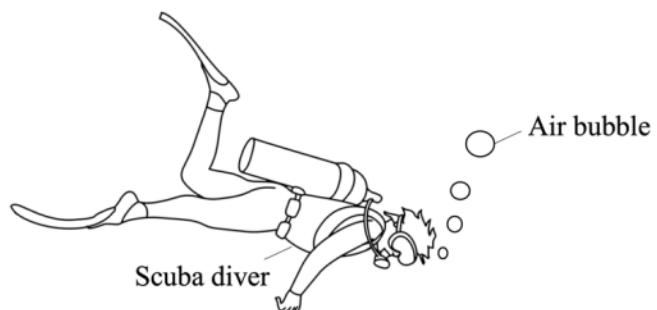


Diagram 17

What happens to the pressure in the air bubbles when they rise to the water surface?

- A** Decreases
- B** Increases
- C** Remain unchanged

21 Diagram 18 shows a manometer connected to a gas supply. The liquid X has a density of $1\ 000\ \text{kg m}^{-3}$.

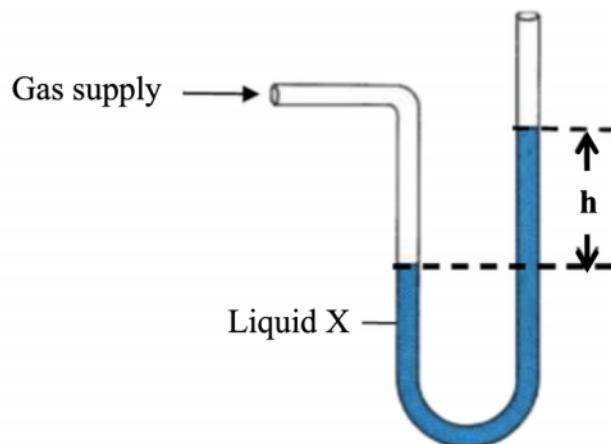


Diagram 18

What happens to h if liquid X is replaced with another liquid which has a density of $789\ \text{kg m}^{-3}$?

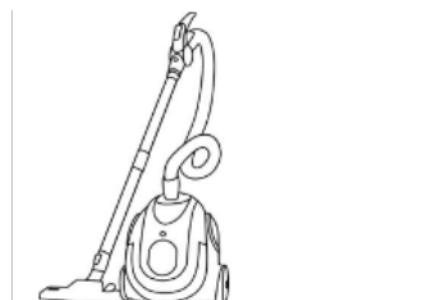
- A Decreases
- B Increases
- C No change

22 Which of the following functions by using Pascal's Principle?

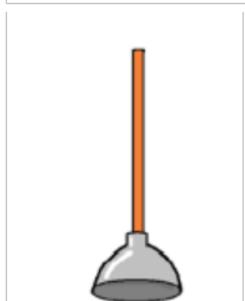
A



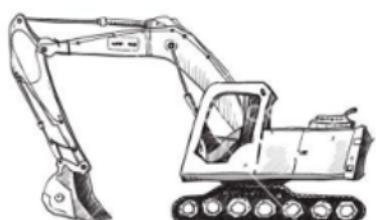
C



B



D



23 Diagram 19 shows a hydraulic compressing machine.

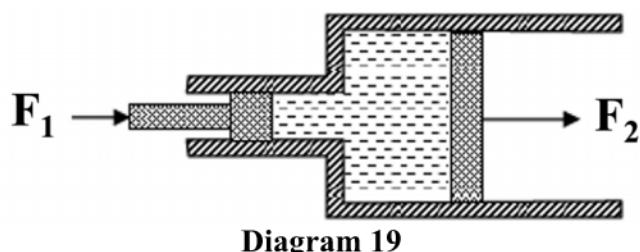


Diagram 19

Which comparison is **true** about the forces F_1 and F_2 ?

- A $F_1 = F_2$
- B $F_1 > F_2$
- C $F_1 < F_2$

24 Diagram 20 shows a simple hydraulic jack.

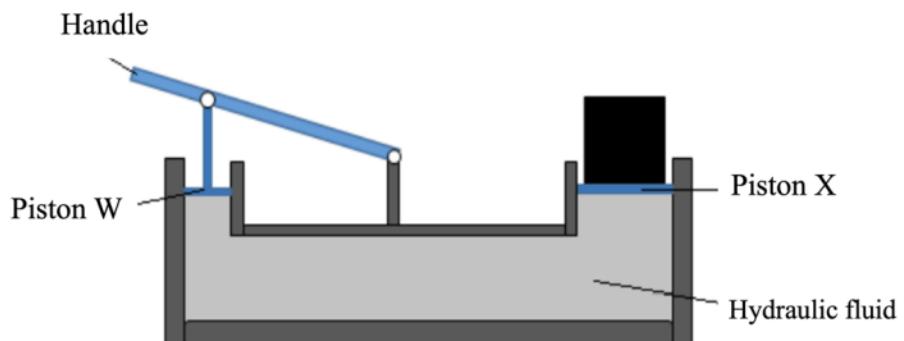


Diagram 20

Which of the following statement will enable heavier loads to be lifted?

	Diameter Piston W	Diameter Piston X
A	Doubled	Remain the same
B	Doubled	Halved
C	Remain the same	Halved
D	Halved	Double

25 Which of the following does not function based on Archimedes' principle?

- A Hydrometer
- B Hot air balloon
- C Ship
- D Aeroplane

26 The function of Plimsoll line on the body of a ship is

A to determine the salinity of water
B to determine the viscosity of water
C to determine the volume of water displaced by the ship
D to determine the maximum load that can be carried by the ship

27 The volume of a hot-air balloon is 600 m^3 . If the density of the air is 1.25 kg m^{-3} , find the buoyant force acting on the balloon.

A 750 N
B 7500 N
C 7257.5 N
D 7357.5 N

28 Diagram 21 shows the roof panel of a house is flying off in a strong wind.

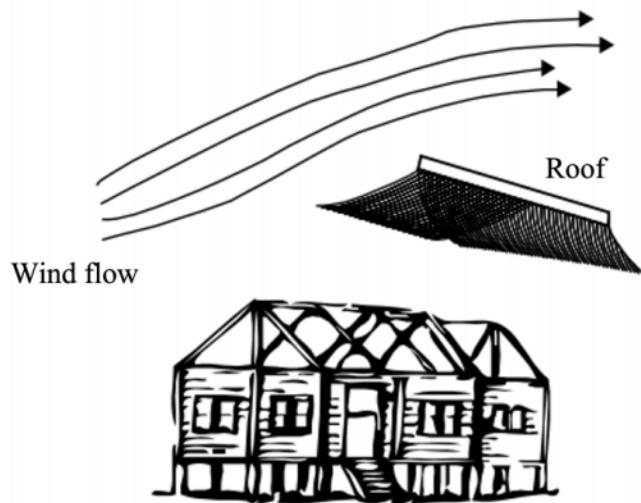


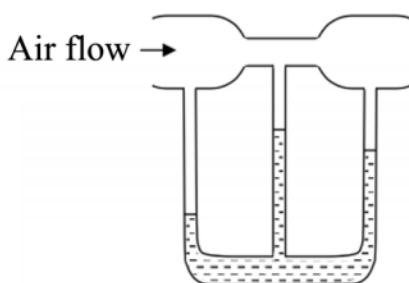
Diagram 21

Which principle explains this event?

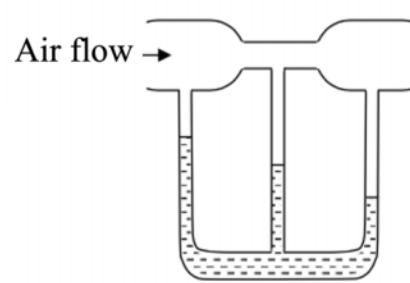
A Pascal's Principle
B Bernoulli's Principle
C Archimedes' Principle
D Principle of conservation of energy

29 Which diagram shows the correct liquid level in the U-tube?

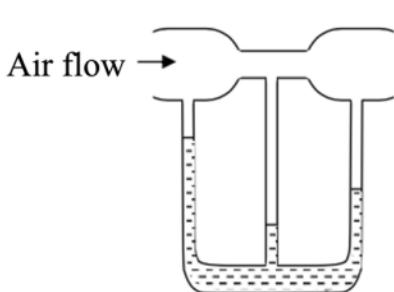
A



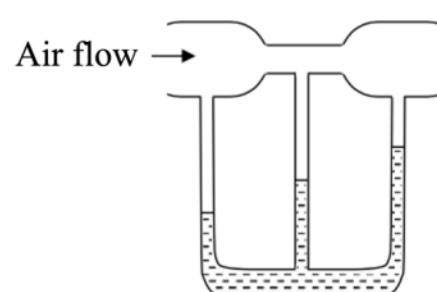
C



B



D



30 Diagram 22 shows the wing of an aeroplane moves with a uniform acceleration in the direction shown by the arrow.

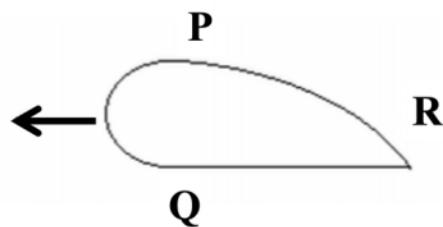
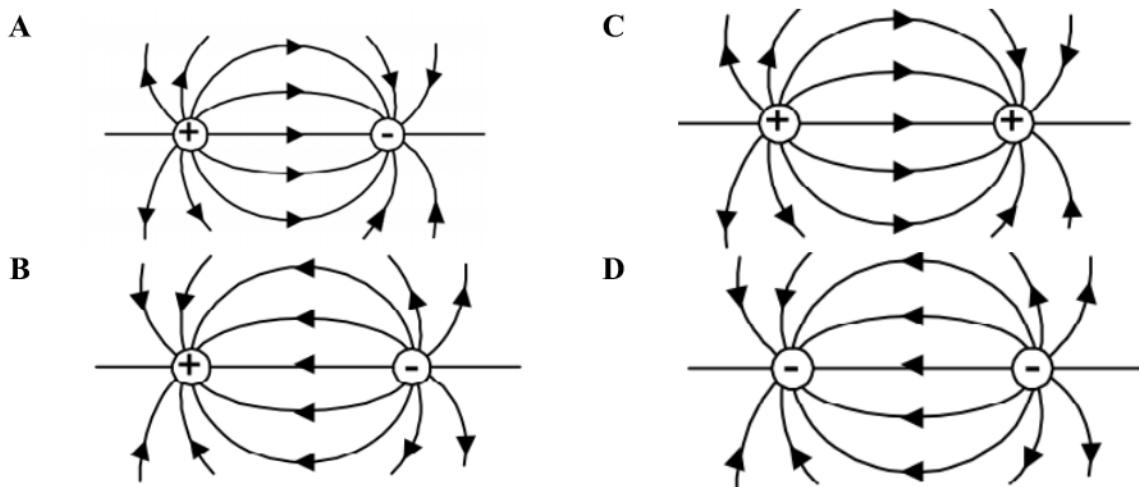


Diagram 22

Which statement is **true**?

- A The pressure in region P is higher than in region Q.
- B The up thrust force is higher than the weight of object.
- C The velocity of air in region P is higher than in region Q.
- D The resultant force in direction of the motion of the object is zero.

31 Which diagram shows the **correct** electric field pattern?



32 Which two electrical quantities are measured in volts?

A current and e.m.f.
B current and resistance
C e.m.f. and potential difference
D potential difference and resistance

33 Diagram 23 shows a charged conducting sphere is oscillates between two plates which are connected to an Extra High Tension (EHT) power supply.

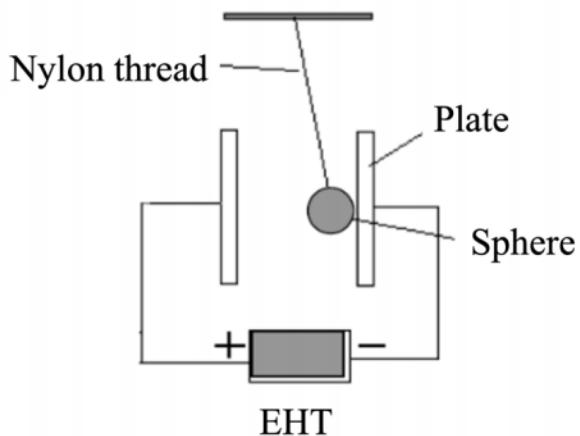


Diagram 23

The frequency of the oscillation of the sphere will increase if

A The distance between the plates is increased.
B The voltage of the EHT is increased.
C The length of the thread is increased.
D The size of the sphere is increased.

34 Diagram 24 shows an electric current that contains three similar resistors.

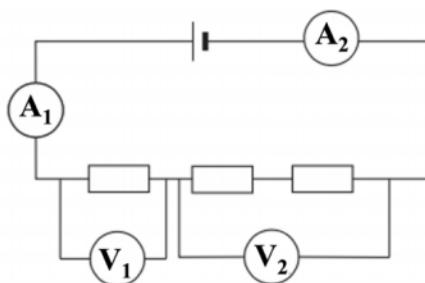


Diagram 24

Which of the following readings is **correct**?

A	$A_1 = A_2$	C	$A_1 > A_2$
B	$V_1 = V_2$	D	$V_1 > V_2$

35 A simple circuit is set up as shown in the Diagram 25. The brightness of the light bulb changes as the rheostat is adjusted.

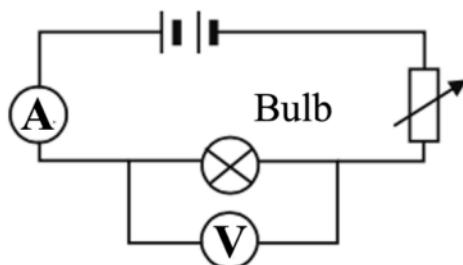


Diagram 25

Which graph best represents the relationship between potential difference, V across the bulb and current, I that flows through it?

36 Diagram 26 shows three resistors connected in a circuit.

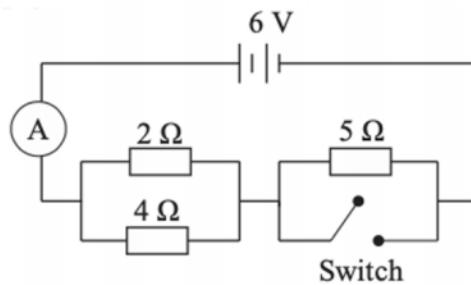


Diagram 26

What is the reading of the ammeter when the switch is closed and then opened?

	Switch closed	Switch opened
A	4.50 A	0.95 A
B	4.55 A	0.55 A
C	5.70 A	0.95 A
D	8.00 A	1.83 A

37 Diagram 27 shows an electric circuit.

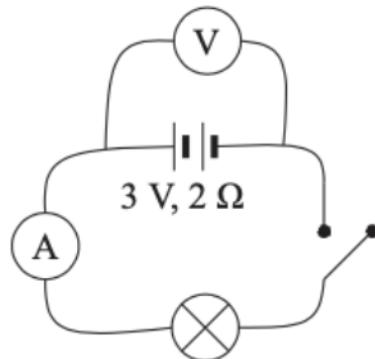


Diagram 27

What is the reading of the voltmeter when the switch is closed?

A $V = 0 \text{ V}$
B $V = 3.0 \text{ V}$

C $V > 3.0 \text{ V}$
D $V < 3.0 \text{ V}$

38 A label 240 V, 1 500 W on electrical kettle means

A 1 500 V of voltage used every 1 second when connected to 240 V supply
B 1 500 W of power used every 1 second when connected to 240 V supply
C 1 500 J of energy used every 1 second when connected to a 240 V supply

39 Diagram 28 shows a circuit that can be used to determine the electromotive force (e.m.f.), E , and internal resistance, r , of a cell.

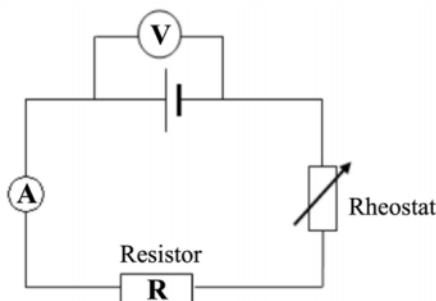
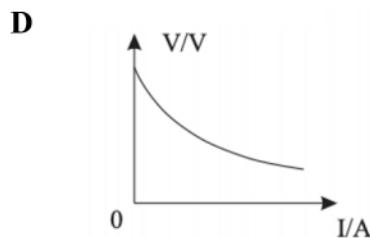
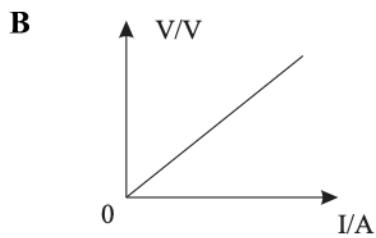
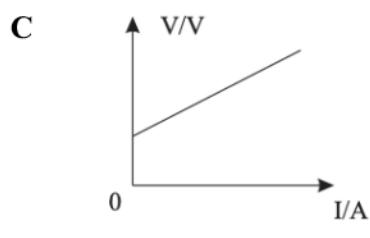
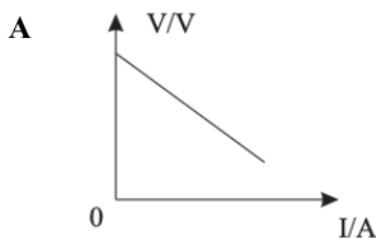


Diagram 28

Which of the following potential difference, V against current, I graph is used to determine the values of E and r of the cell?



40 Diagram 29 shows two types of light bulbs.

The normal operating currents for bulb X and bulb Y are I_X and I_Y respectively.



Bulb X: 12 V, 36 W



Bulb Y: 240 V, 120 W

Diagram 29

Which of the following gives the **correct** comparison between I_X and I_Y ?

A $I_X < I_Y$

B $I_X > I_Y$

C $I_X = I_Y$

END OF QUESTION PAPER