OVERMUGGED O LEVEL MOCK PAPER 2021
SECONDARY 4 EXPRESS
SECONDARY 5 NORMAL ACADEMIC

COMBINED SCIENCE (PHYSICS) **5076/01**
PAPER 1: MULTIPLE CHOICES **September 2021**
1 hour

INSTRUCTIONS TO CANDIDATES

There are **forty** questions in this paper. Answer **all** questions. For each question, there are 4 possible answers, **A, B, C and D**.

Choose the one you consider correct.

Each correct answer wills score one mark. A mark will not be deducted for a wrong answer.

The use of an approved scientific calculator is expected, where appropriate.

**Questions in this mock paper may contain adapted questions from the Ten Year Series and Prelim Papers from various schools in Singapore.*

1. Diagram I shows the vernier calipers **when the jaws are fully closed.** Diagram II shows the same vernier calipers after measuring an object.

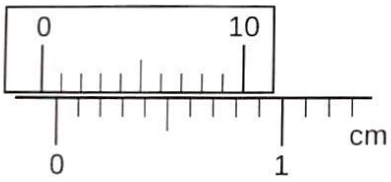


Diagram I

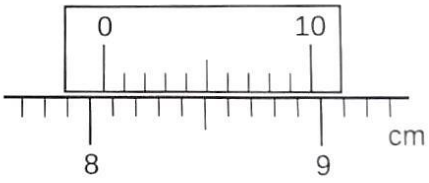


Diagram II

What is the **actual length** of the object?

(A) 8.09cm
(B) 8.13cm
(C) 8.19cm
(D) 8.23cm

Zero error = -0.07cm
Reading = 8.06cm
Actual = 8.06 – (-0.07) = 8.13cm

B

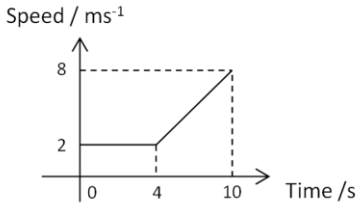
2. Which of the following is **not a vector quantity**?

(A) Displacement
(B) Acceleration
(C) Weight
(D) Speed

D

3. A runner was running at a constant speed of $2ms^{-1}$ for the first 4s and starts accelerating by $1ms^{-1}$ for the next 6s. Calculate his **average speed**.

(A) 2.4 ms^{-1}
(B) 3.8 ms^{-1}
(C) 4.0 ms^{-1}
(D) 5.0 ms^{-1}



Avg speed = Total dist / total time
= (2x4)+(2x6 + ½ x6x6) / 10s

B

4. A diver is sinking into the water at a **constant speed of 0.4 m/s**. What is the resultant force acting upon the diver if the diver and his gear weigh 100kg?

(A) O N
(B) 40N
(C) 960N
(D) 1000N

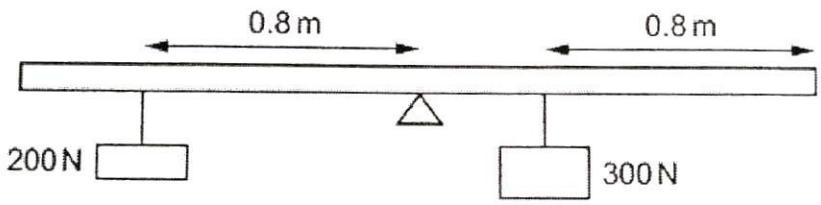
A

5. Which property of an object resists a change in its state of rest or motion?

(A) Acceleration
(B) Weight
(C) Velocity
(D) Mass

D

6. A uniform bar of length 2.4m is pivoted exactly at its midpoint as shown in the diagram below.

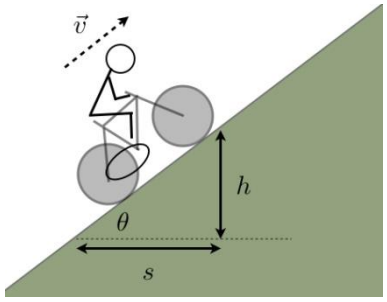


Determine the **resultant moment**.

	Moment /Nm	Direction
(A)	40	Clockwise
(B)	40	Anti-clockwise
(C)	80	Clockwise
(D)	80	Anti-clockwise

B

7. A man rides a bicycle and accelerates up a slope.



How does the man's kinetic and gravitational potential energy change as he goes up the slope?

	Kinetic Energy	Gravitational Potential Energy
(A)	Decrease	Increase
(B)	Increase	Increase
(C)	Decrease	Decrease
(D)	Increase	Decrease

B

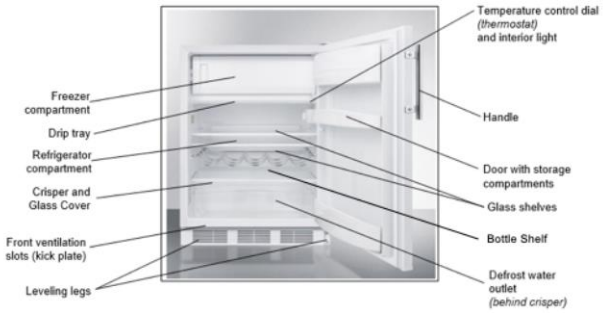
8. A ninja van driver with mass of 60kg carries a delivery package of mass 25kg up a flight of stairs that has a vertical height of 30m in exactly 2 minutes.

Find the **power** produced by the man.

(A) 213W
(B) 440W
(C) 9380W
(D) 93800W

A

9. Refrigerator usually has the freezer compartment at the top as shown in the diagram below.



Determine the **effect of the air** particles in the freezer compartment.

	Air particles	Density of air
(A)	Become smaller	Increase
(B)	Become smaller	Decrease
(C)	Move closer together	Increase
(D)	Move closer together	Decrease

C

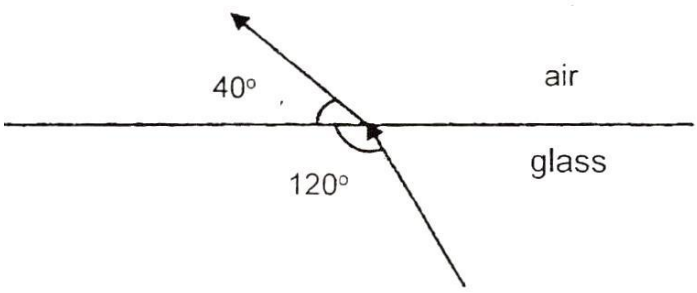
10. Which statement(s) is **true** for **boiling and evaporation?**

(i) Boiling occurs at the surface of the liquid.
(ii) Evaporation occurs at any temperature.
(iii) Boiling will result in bubbles being formed.
(iv) Evaporation requires a source of energy.

(A) i & ii only
(B) i, ii & iii only
(C) ii & iii only
(D) ii, iii & iv only

C

11. The diagram below shows a ray of light passing from glass into air.



Determine the refractive index of the glass.

(A) 0.75
(B) 1.2
(C) 1.5
(D) 4.0

C

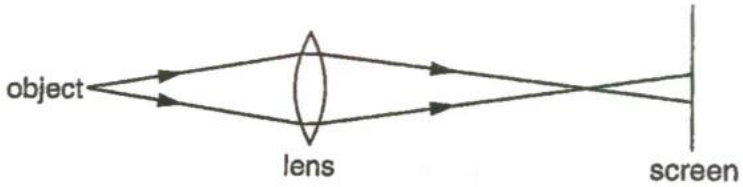
12. Which statement(s) is **true** for **total internal reflection**?

(i) Total internal reflection only occurs when light travels from an optically denser medium to air/vacuum.
(ii) Total internal reflection occurs when incident angle is greater than critical angle.
(iii) Critical angle is the angle of incidence when the refracted ray is 90 degrees.
(iv) Light rays have to travel from a denser medium to a less dense medium for total internal reflection to occur.

(A) i & ii only
(B) i, ii & iii only
(C) ii & iii only
(D) ii, iii & iv only

C

13. A blurred image of the object is formed on the screen.



How can an in-focus image be captured on the screen?
(A) Use a brighter object
(B) Move the screen away from the lens
(C) Use a lens of longer focal length
(D) Move the object away from the lens

C

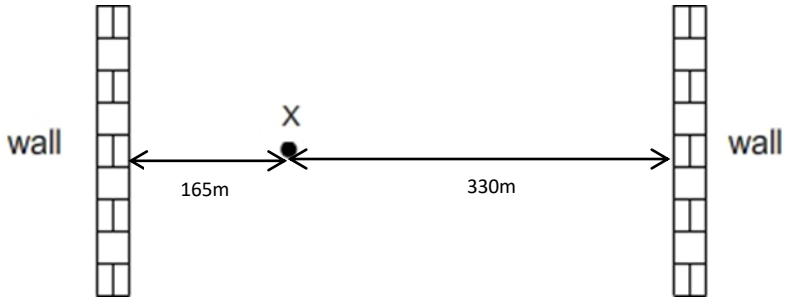
14. Two notes of **different loudness** but the **same pitch** were played on a musical instrument.

The two sound waves produced will have:

(A) Same amplitude and the same speed
(B) Same frequency and different speed
(C) Different amplitude and same speed
(D) Different amplitude and different speed

C

15. Refer to the diagram below.



(Speed of sound in air is $330ms^{-1}$)

When Jung Kook claps his hand at point X, he hears a total of 2 echoes. Calculate the **time interval between the 2 echoes.**

(A) 0s
(B) 0.5s
(C) 1s
(D) 2s

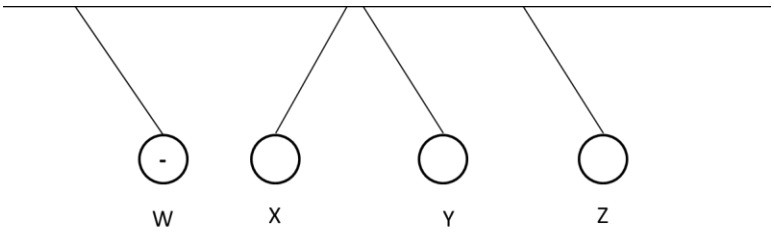
Time taken for first echo = Distance / speed
= (165m x 2) / 330 = 1s

Time taken for second echo = Distance / speed
= (330m x 2) / 330 = 2s

Time interval = 2s- 1s = 1s

C

16. Four charged [illegible]ely charged.



What are the charges on X, Y & Z?

	X	Y	Z
A	Positive	Negative	Positive
B	Positive	Positive	Positive
C	Positive	Positive	Negative
D	Negative	Positive	Positive

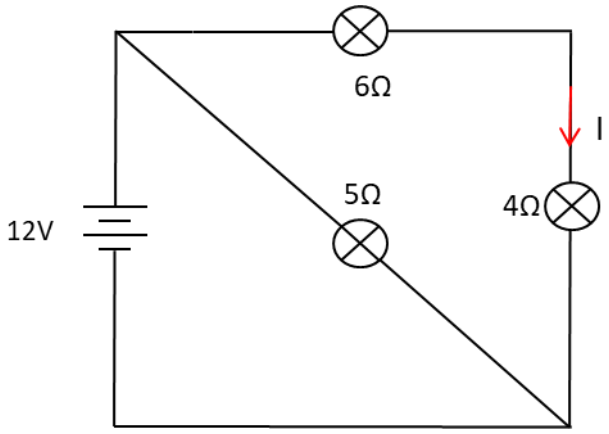
B

17. Which quantity is equal to **the electromotive force (emf)** for a circuit?

(A) The power used by the source in driving one electron around the complete circuit.
(B) The power used by the source in driving one coulomb of charge around the complete circuit.
(C) The work done by the source in driving one electron around the complete circuit.
(D) The work done by the source in driving one coulomb of charge around the complete circuit.

D

18. The diagram below shows a circuit with 3 light bulbs of different resistances.

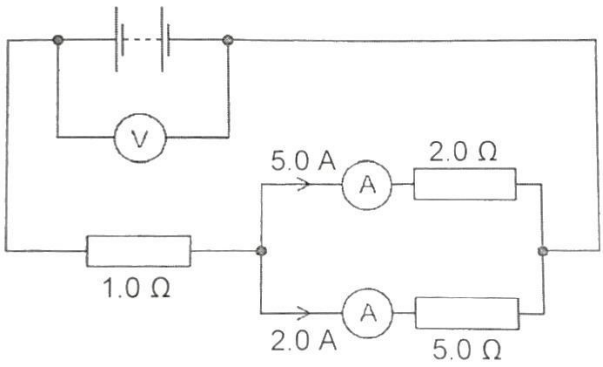


What is the current flowing through the 4Ω light bulb?

(A) 048A
(B) 1.2A
(C) 2.4A
(D) 3.6A

B

19. Refer to the circuit diagram below.



Determine the reading in the voltmeter.

(A) 10V
(B) 17V
(C) 27V
(D) 56V

B

20. The power of an electrical heater is 3.0kW. The heater is switched on for 2.5 hours. The cost for using this heating was $1.20.

Determine the **cost of 1kWh** of electrical energy.

(A) 16 cents
(B) 17 cents
(C) 40 cents
(D) 48 cents

A