SULIT
4531/1
Physics
Kertas 1
September
2008
1 ¼ jam

ZON A BAHAGIAN GABUNGAN KUCHING

PEPERIKSAAN PERCUBAAN SPM

2008

PHYSICS

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

INFORMATION FOR CANDIDATES

1. *This question paper consists of* **50** *questions.*
2. *Answer* **all** *questions.*
3. *Answer each question by blackening the correct space on the answer sheet.*
4. *Blacken only one space for each question.*
5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *Your may use a non-programmable scientific calculator.*
8. *A list of formulae is provided on page 2.*

Kertas soalan ini mengandungi **26** halaman bercetak

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

4531/1 © 2008 Zon A Kuching

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

1. $a = \frac{v-u}{t}$

2. $v^2 = u^2 + 2as$

3. $s = ut + \frac{1}{2}at^2$

4. Momentum = mv

5. $F = ma$

6. Kinetic energy = $\frac{1}{2}mv^2$

7. Potential energy = mgh

8. Elastic potential energy = $\frac{1}{2}Fx$

9. Power, $P = \frac{\text{energy}}{\text{time}}$

10. $\rho = \frac{m}{V}$

11. Pressure, $p = h\rho g$

12. Pressure, $p = \frac{F}{A}$

13. Heat , $Q = mc\theta$

14. Heat, $Q = mL$

15. $\frac{PV}{T} = \text{constant}$

16. $n = \frac{\sin i}{\sin r}$

17. $n = \frac{\text{real depth}}{\text{apparent depth}}$

18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

19. Linear magnification, $m = \frac{v}{u}$

20. $v = f\lambda$

21. $\lambda = \frac{ax}{D}$

22. $Q = It$

23. $E = VQ$

24. $V = IR$

25. Power, $P = IV$

26. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

27. Efficiency $= \frac{I_s V_s}{I_p V_p} \times 100\%$

28. $E = mc^2$

29. $g = 10 \text{ m s}^{-2}$

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Each question is followed by either **three** *or* **four** *options. Choose the best option for each question, and then blacken the correct space on the answer sheet.*

1 Which of the following measurements is the shortest?

A 1.23×10^3 m

B 1.23×10^4 cm

C 1.23×10^7 mm

D 1.23×10^9 μm

2 Which of the following is **not** a base quantity?

A Electric current

B Temperature

C Length

D Weight

3 The measurement of the diameter of a concrete pipe yields the following readings :

32.3 cm;	33.1 cm;	32.8 cm;	32.9 cm;	32.4 cm;	32.7 cm

If the actual value of the thickness is 32.5 cm, which of the following best describes the measurement?

A consistent and accurate

B consistent but not accurate

C not consistent but accurate

D not consistent and not accurate

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

4 Diagram 1 shows the graph of A against $\frac{1}{B}$.

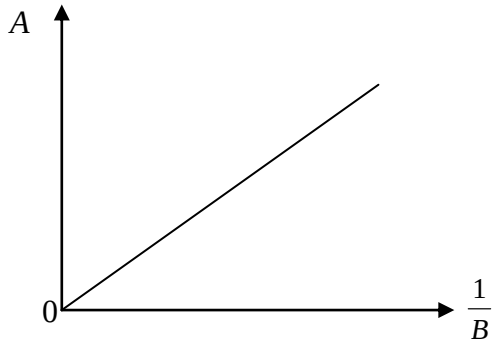


Diagram 1

What is the relationship between A and B?

A A is directly proportional to B.

B A is inversely proportional to B.

C A does not depend on B.

D A is a constant quantity.

5 Diagram 2.1 shows the velocity-time graph for a moving object. Diagram 2.2 shows a graph of quantity Y against time corresponding to the motion of this object.

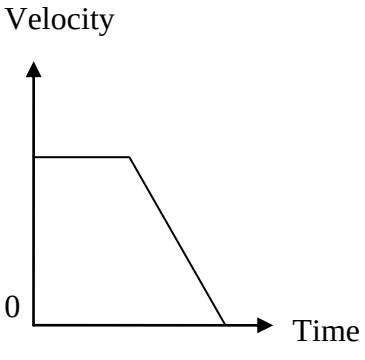


Diagram 2.1

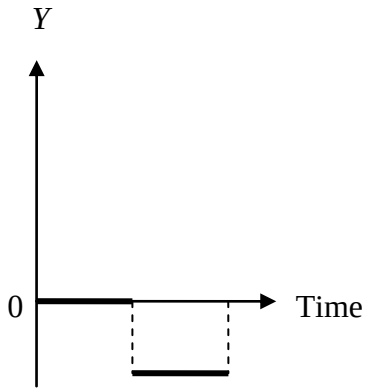


Diagram 2.2

What is the quantity, Y?

A Displacement

B Acceleration

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

C Pressure

D Momentum

6 Diagram 3 shows a large ocean liner approaching a port.

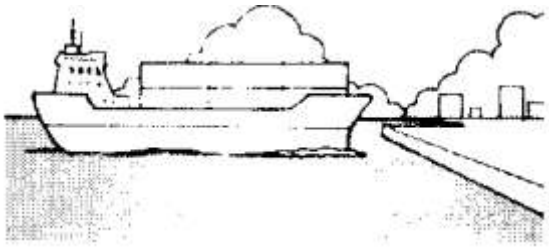


Diagram 3

It takes a long time for the ocean liner to slow down and stop because

A it exerts a large force.

B the water resistance is too big.

C its propellers are not strong enough.

D its inertia is large.

7 Diagram 4 shows a man pushing a trolley with a force of 45 N after shopping in a hypermarket.

Diagram 4

The total mass of the trolley and the items inside it is 20 kg. The frictional force acting on the trolley is 30 N. Find the acceleration of the trolley.

A 0.50 m s $^{-2}$

B 0.75 m s $^{-2}$

C 1.50 m s $^{-2}$

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

D $2.25\ m\ s^{-2}$

8 Diagram 5 shows a stone and a plasticine ball of equal mass dropped from the same height onto a glass plate which is put on the ground.

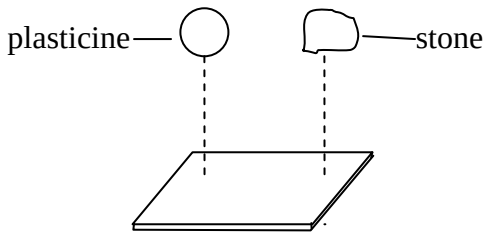


Diagram 5

It is found that the glass plate cracks where the stone hits whereas it does not crack where the plasticine ball hits. What causes this to happen?

A The stone comes to a stop in a shorter time on hitting the glass compared to the plasticine ball.

B The stone has less air resistance as it drops through the air compared to the plasticine ball.

C The stone has a bigger weight than the plasticine ball.

D The stone has a higher density than the plasticine ball.

9 Diagram 6 shows an aluminium sphere and a copper sphere each of mass 1 kg. The two spheres are released from the same height at the same time in a vacuum tube.

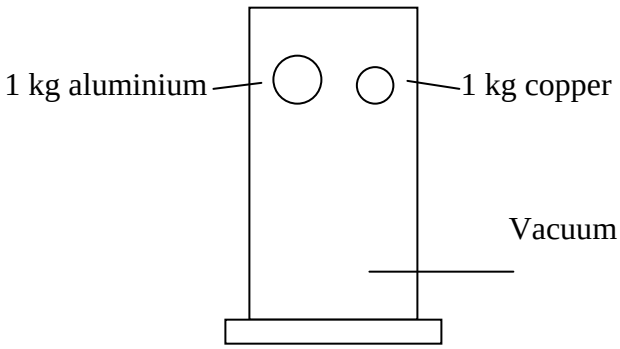


Diagram 6

When they reach the bottom of the tube, both the spheres will **not** have the same

A inertia.

B density.

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

C velocity.

D acceleration.

10 Diagram 7 shows a burger stall being pushed by a man with a force *F* through a distance *x*.

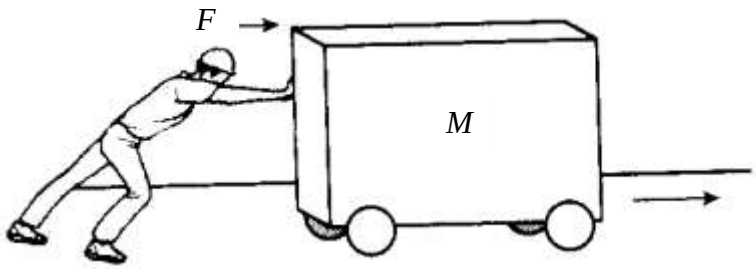


Diagram 7

Which of the following will not change the amount of work done by the man?

A Increasing the force *F*

B Increasing the distance moved

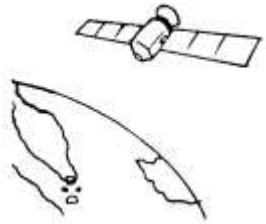
C Increasing the mass of the burger stall, *M*

11 In which of the following cases is the kinetic energy of the object greatest?

A

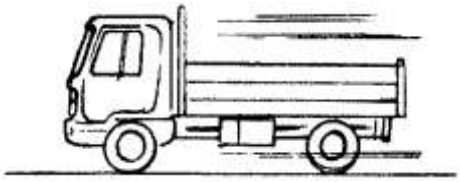
Mass of car = 800 kg
Speed = 12 m s $^{-1}$

B



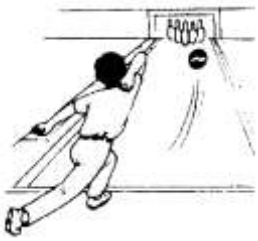
Mass of satellite = 50 kg
Speed = 100 m s $^{-1}$

C



Mass of lorry = 5000 kg
Speed = 2 m s $^{-1}$

D



Mass of bowling ball = 6 kg
Speed = 10 m s $^{-1}$

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

12 Diagram 8 shows a 50 g mass hung from a combination of three identical springs from a ceiling.

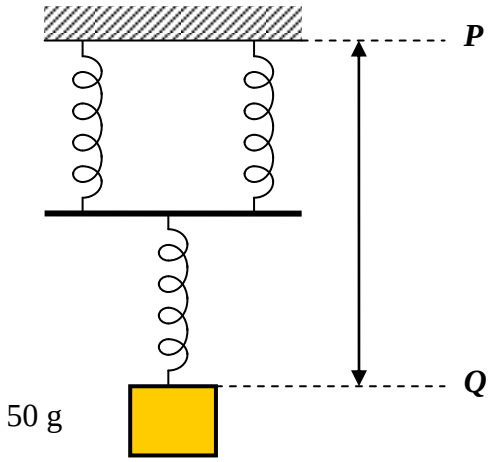


Diagram 8

Separately, each spring will be extended by 1 cm when a 10 g load is hung from one end. If the original length of each spring is 10 cm, what is the length between *P* and *Q*?

A 15.0 cm

B 27.5 cm

C 30.0 cm

D 37.5 cm

13 The head of a thumbtack is big and thus have a big surface area. What is the advantage of this structure in the thumbtack?

A To save material when making the thumbtack.

B To reduce the pressure on the thumb.

C To produce a large force on the thumbtack.

D So that the thumbtack do not break easily.

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

14 Diagram 9 shows the cross-section of a dam.

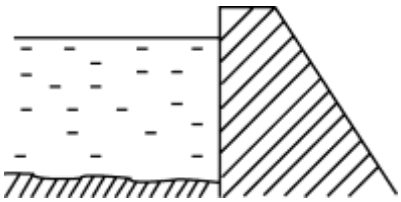


Diagram 9

Why does the thickness of the dam increase towards the base of the dam?

A Water pressure increases with depth.

B The density of water increases towards the base of the dam.

C So that more water can be stored.

D Less material is needed to build the dam.

15 Oil, water and mercury are filled into three containers of different shapes as shown in Diagram 10.

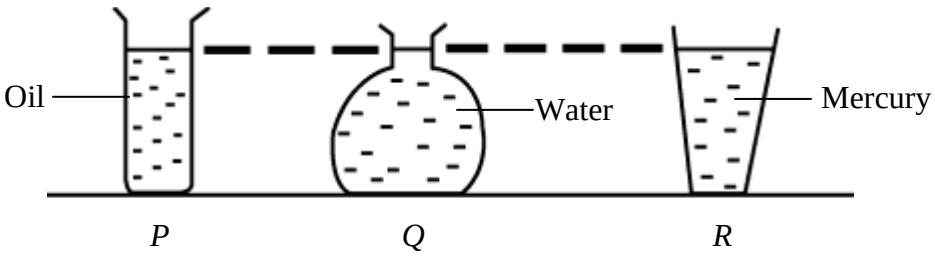


Diagram 10

The pressure on the base of the container is the greatest in container

A *P*

B *Q*

C *R*

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

16 The container in Diagram 11 contains an incompressible liquid. A downward force of 12 N is exerted on piston *K*.

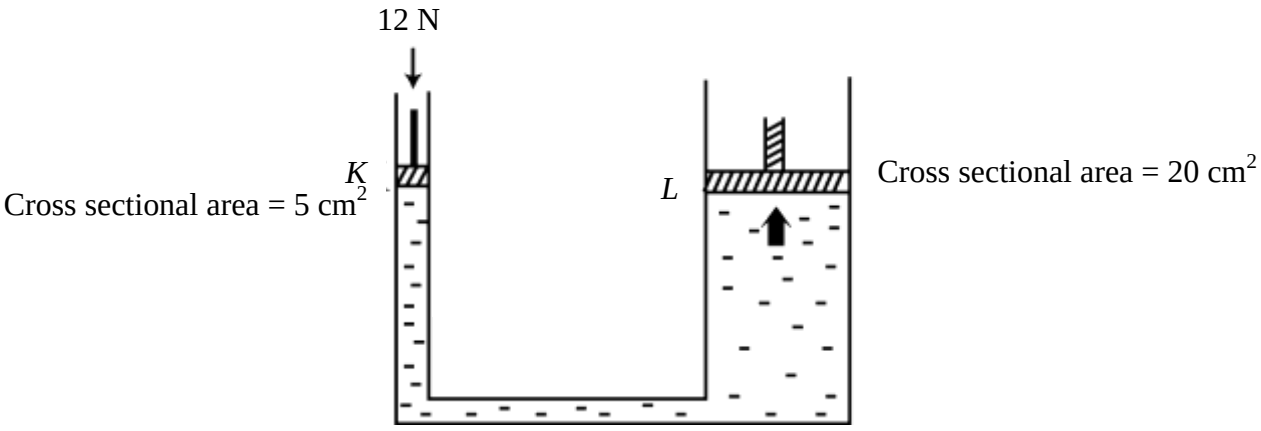


Diagram 11

What is the magnitude of the force experienced by piston *L*?

A 3 N

B 12 N

C 24 N

D 48 N

17 Among the measuring instruments below, which instrument is used to measure the pressure of a gas in an enclosed container?

A Manometer

B Hydrometer

C Barometer

18 Two ships travelling in the open sea are not encouraged to move parallel to each other in the same direction so as to avoid colliding with each other. This can be explained by

A Archimedes' Principle.

B Bernoulli's Principle.

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

C Pascal's Principle.

19 Diagram 12 shows two metals *X* and *Y* in an enclosed container.

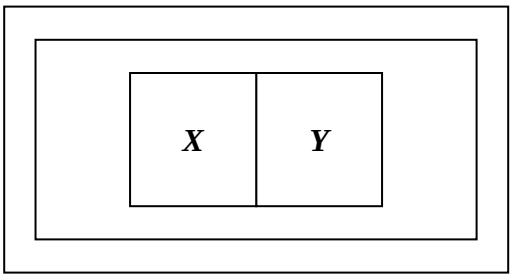


Diagram 12

If *X* and *Y* are in thermal equilibrium, which of the following statements is **true**?

A The volume of *X* and *Y* is the same.

B The temperature of *X* and *Y* is the same.

C The physical properties of *X* and *Y* is the same.

D The arrangement of molecules in *X* and *Y* is the same

20 Diagram 13 shows a metal sphere at temperature of 90°C immersed in a liquid at temperature of 40 ° C.

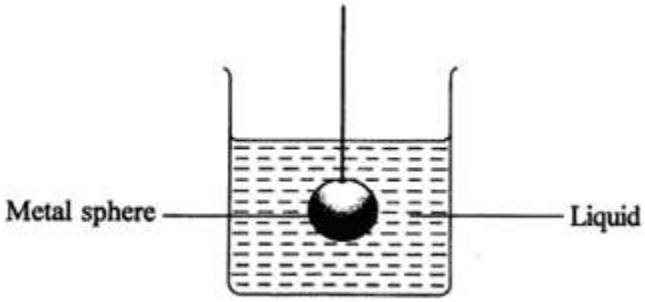


Diagram 13

What is the temperature of the metal sphere when thermal equilibrium is achieved between the sphere and the liquid?

A Less than 40 ° C

B More than 90 ° C

C Between 40 ° C and 90 ° C

D Same as room temperature

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

21 A refrigerator turns 550 g of water at 15 ^{o}C into ice at -5 ^{o}C.
How much heat is absorbed by the refrigerator?

[specific heat capacity of water = 4200 J kg $^{-1}$ ^{o}C $^{-1}$;
specific heat capacity of ice = 2 100 J kg $^{-1}$ ^{o}C $^{-1}$;
specific latent heat of fusion of ice = 3.34×10^{5} J kg $^{-1}$]

A 1.25×10^{5} J

B 1.75×10^{5} J

C 2.18×10^{5} J

D 2.24×10^{5} J

22 Whenever matter changes from one phase to another, some energy is either released or absorbed without change of temperature. The energy is called

A latent heat

B heat capacity

C thermal energy

23 When the gas in an enclosed container is heated at fixed pressure, what will happen to the frequency of collision between the gas molecules?

A It decreases.

B It increases.

C It remains constant.

24 Which of the following is a common characteristic of an image formed both by a plane mirror and a simple microscope?

A Virtual

B Same size as the object

C Bigger than the object

D Inverted

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

25 A fish in a pond appears to be 1.6 m from the surface of the water. The refractive index of water in the pond is 1.33.What is the real depth of the fish?

A 0.84 m

B 1.20 m

C 1.24 m

D 2.13 m

26 Diagram 14 shows two light rays propagating from water to air.

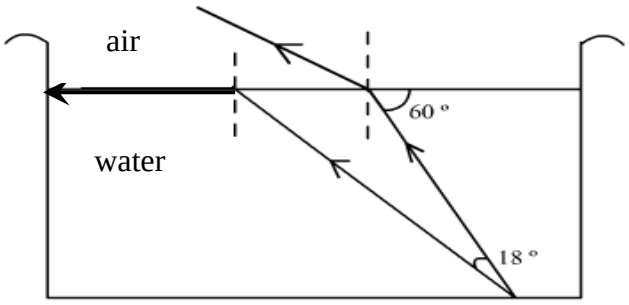


Diagram 14

What is the critical angle for water?

A 18 °

B 23 °

C 42 °

D 48 °

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

27 Diagram 15 shows the components of a slide projector.

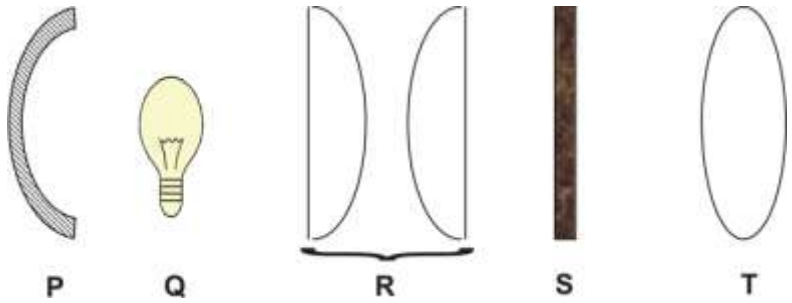


Diagram 15

The following statements are correct **except**

	Component	***Function***
A	P	Reflects the light
B	Q	Light source
C	R	Focus evenly the rays to the screen
D	S	Object

28 Diagram 16 shows a student using a magnifying glass to enlarge the image of the script of an old map.

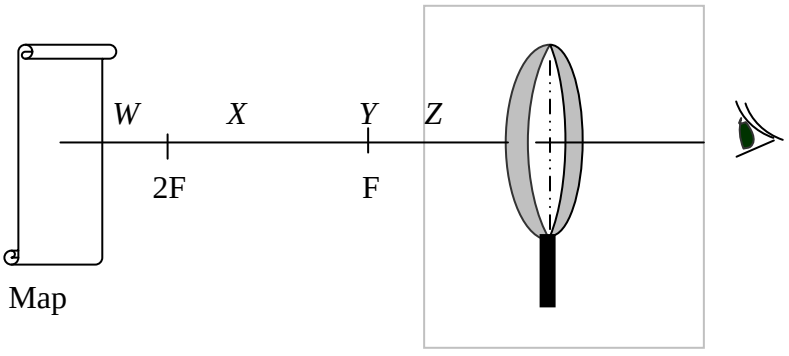


Diagram 16

Which of the following positions, *W*, *X*, *Y* and *Z* will be the best position to place the map?

A *W*

B *X*

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

C *Y*

D *Z*

29 Which of the following has the highest frequency?

A Gamma ray

B Ultraviolet light

C Infrared light

D X-ray

30 Diagram 17 shows the displacement-time graph of a wave.

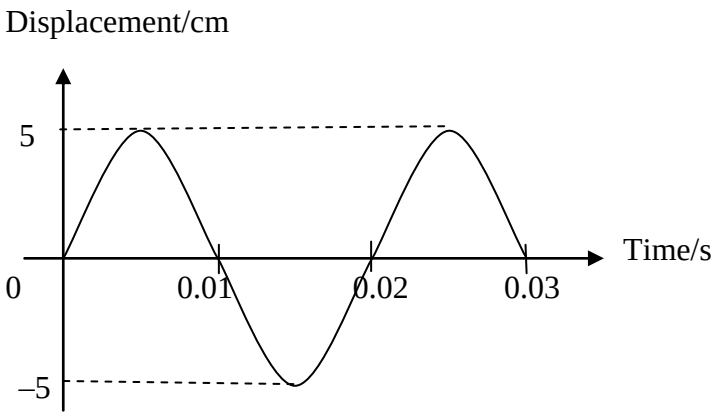


Diagram 17

Choose the correct amplitude and frequency of the waves.

	Amplitude/cm	Frequency/Hz
A	5	100
B	5	50
C	10	50
D	10	100

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

31 Diagram 18 shows a swimming pool with increasing depth from left to right.

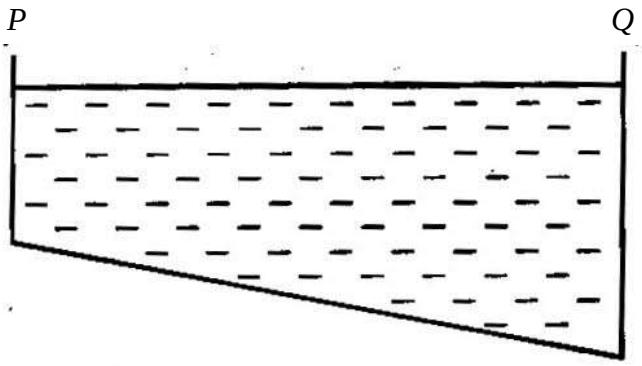


Diagram 18

When a plane water wave moves from *Q* to *P*, which of the following of the water waves will decrease?

A Frequency

B Wavelength

C Direction of propagation

D Amplitude

32 Diagram 19 shows plane water waves approaching a slit between two obstacles.

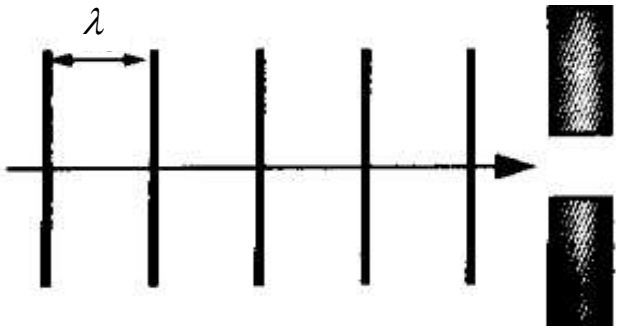


Diagram 19

The effect of the diffraction of the water wave increases when the wavelength, λ,

A is constant.

B decreases.

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

C increases.

33 A girl can hear her brother singing loudly in his room with the door open even though she did not enter her brother's room. This phenomenon is due to

A reflection of sound wave

B interference of sound wave

C refraction of sound wave

D diffraction of sound wave

34 Diagram 20 shows the fringes on a screen from a Young's double-slit experiment using a monochromatic light of wavelength 550 nm. The distance between the double-slit and the screen is 1.5 m.

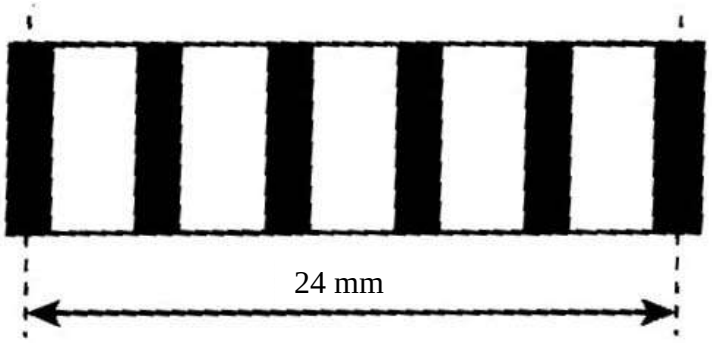


Diagram 20

What is the separation between the two slits?

A 0.10 mm

B 0.17 mm

C 0.28 mm

D 0.35 mm

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

35 Diagram 21 shows a graph of potential difference against current for a conductor.

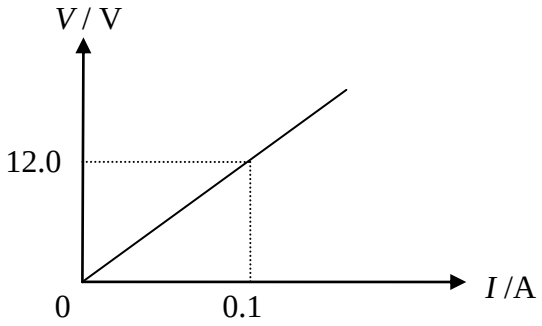


Diagram 21

Which of the following is **not** true for the conductor?

A The conductor obeys Ohm's Law

B The resistance of the conductor is 120 Ω

C The potential difference is directly proportional to the current

D The quantity of charge flowing is 0.1 coulomb per second

36 Diagram 22 shows a circuit containing three resistors connected in series and in parallel.

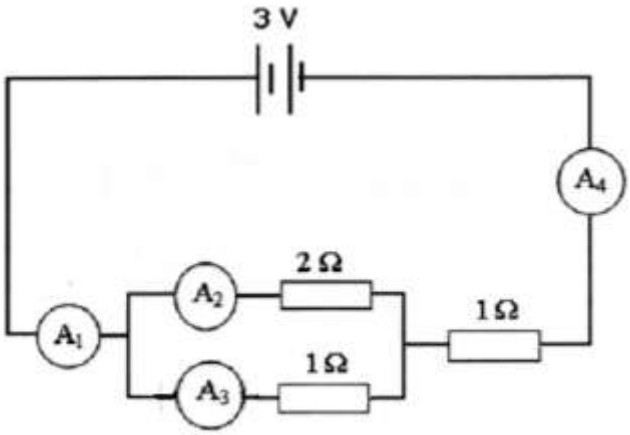


Diagram 22

Which ammeter has the smallest reading?

A A_1

B A_2

C A_3

D A_4

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

37 The motor in Diagram 23 can lift a 0.8 kg load to a height of 2 m from the ground in 2 s when it is switched on.

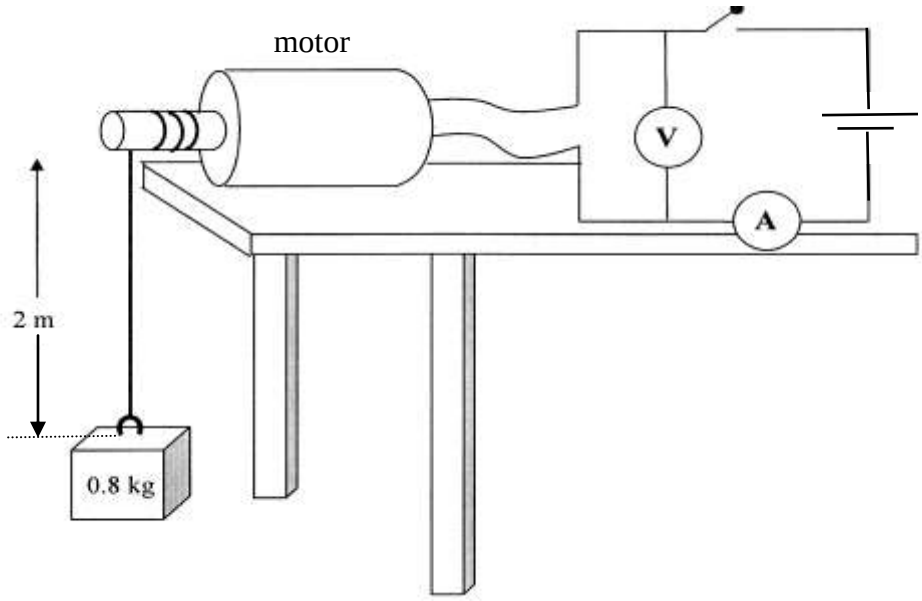


Diagram 23

The current flow in the motor is 1.0 A.
Assuming that the motor is 100% efficient, what is the reading of the voltmeter?

A 2.0 V

B 4.0 V

C 6.0 V

D 8.0 V

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

38 Diagram 24 shows the usage of electrical energy during day time and night time for four consecutive days.

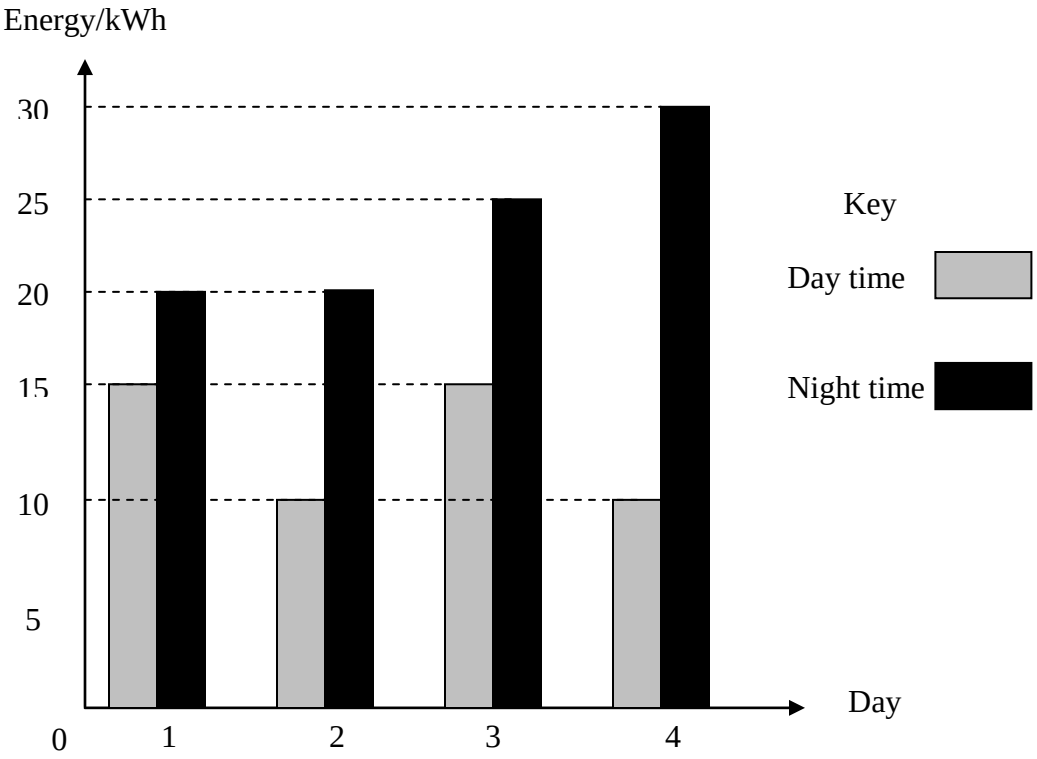


Diagram 24

kWh	Cost per kWh
First 100	20 sen
Next 900	23 sen

Calculate the cost, in RM, of the electrical energy used for the four days.

A RM 19.00

B RM 29.00

C RM 30.35

D RM 33.35

39 Which of the following factors does not affect the speed of rotation of a motor coil?

A The length of the magnet.

B The number of turns on the coil.

C The magnitude of the current.

D The strength of the magnet.

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

40 Which of the following materials is suitable to be used as the core of an electromagnet?

A Bronze

B Copper

C Iron

D Silver

41 Diagram 25 shows a compass placed near a current-carrying solenoid.

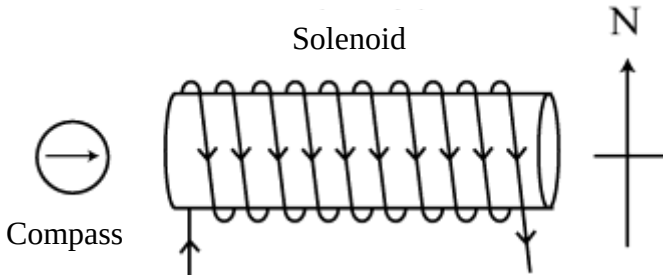


Diagram 25

What will happen to the pointer of the compass if the current flowing through the solenoid is switched off?

A The pointer will point to the North.

B The pointer will point to the West.

C There is no change in the direction of the pointer.

D The pointer will spin continuously.

42 The input voltage and output voltages of an ideal transformer is 240 V a.c. and 12 V a.c. respectively. If the current in the primary coil of the transformer is 5 A, what is the value of current in the secondary coil?

A 100 A

B 80 A

C 60 A

D 40 A

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

43 The efficiency of transmitting electrical power by cable through a great distance can be improved by

A lowering the voltage and using thick cable.

B lowering the voltage and using big current.

C increasing the voltage and using thin cable.

D increasing the voltage and using thick cable.

44 Diagram 26.1 shows the *x*-plates, *P*, *Q*, and the *y*-plates, *R*, *S*, of a CRO.
Diagram 26.2 shows the position of the bright spot on the CRO screen.

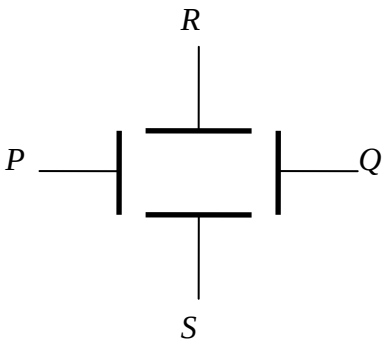


Diagram 26.1

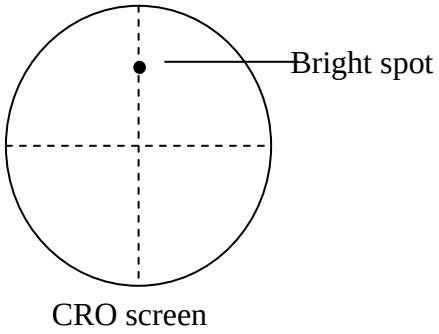


Diagram 26.2

Which of the following is true of the signs of the voltage applied at *P*, *Q*, *R*, and *S*?

	P	***Q***	***R***	***S***
A	+	−	+	−
B	−	+	+	−
C	0	0	−	+
D	0	0	+	−

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

45 Diagram 27 shows four diodes connected to the output of a transformer to produce full wave rectification.

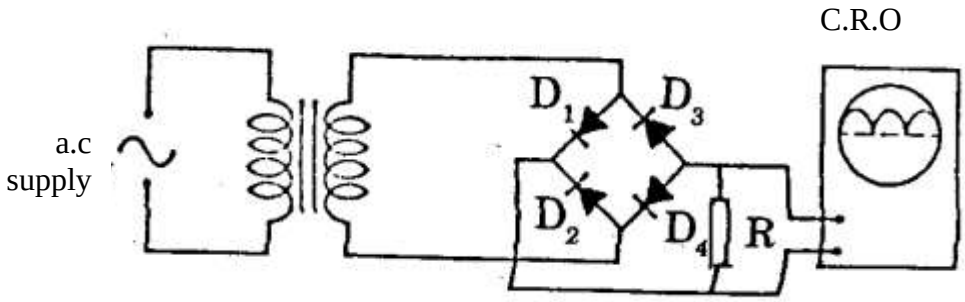
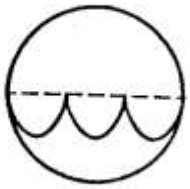


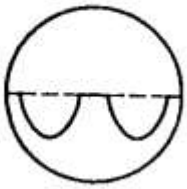
Diagram 27

Which of the following will be shown on the C.R.O. screen if D_3 and D_4 are reversed?

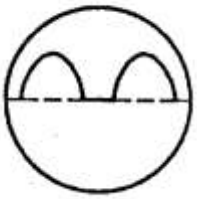
A



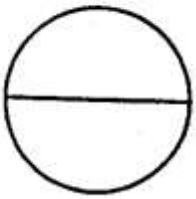
C



B



D



Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

46 Diagram 28 shows an n-p-n transistor circuit.

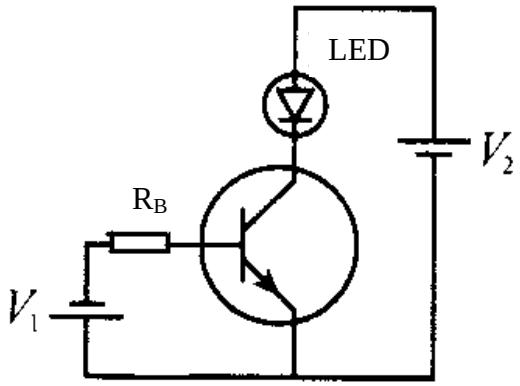


Diagram 28

The LED does not light up. Which of the following must be done to light up the LED?

A Reverse the terminals of cell V_1

B Reverse the terminals of cell V_2

C Reverse the terminals of the LED

D Replace the n-p-n transistor to a p-n-p transistor

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

47 Diagram 29 shows the input and output signals for an unknown single logic gate, *X*.

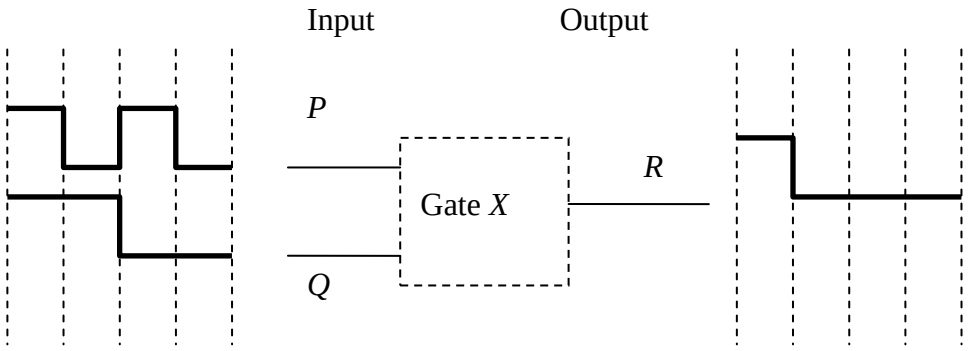


Diagram 29

What is the logic gate X?

A NAND gate

B NOR gate

C AND gate

D OR gate

48 Which of the following is true about alpha, beta and gamma radiation?

	Alpha radiation	Beta radiation	Gamma radiation
A	High energy electron	Helium nucleus	Electromagnetic waves
B	Electromagnetic waves	Helium nucleus	High energy electron
C	Helium nucleus	Electromagnetic waves	High energy electron
D	Helium nucleus	High energy electron	Electromagnetic waves

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

49 An ancient artifact contains $\frac{1}{32}$ of its original content of radioactive carbon-14.

What is the age of the ancient artifact if the half-life of the carbon-14 is 5 600 years?

A 11 200 years

B 16 800 years

C 22 400 years

D 28 000 years

50 The following equation shows a fusion reaction.

$$ {}^{2}_{1}\mathrm{H} + {}^{3}_{1}\mathrm{H} \longrightarrow {}^{4}_{2}\mathrm{He} + {}^{1}_{0}\mathrm{n} $$

Given:

Mass of
${}^{2}_{1}\mathrm{H}$ = 2.01410 a.m.u.,
${}^{3}_{1}\mathrm{H}$ = 3.01605 a.m.u.,
${}^{4}_{2}\mathrm{He}$ = 4.00260 a.m.u.,
${}^{1}_{0}\mathrm{n}$ = 1.00867 a.m.u.

1 a.m.u. = 1.66×10^{-27} kg,
$c = 3.0 \times 10^{8}$ m s^{-1}

What is the energy produced in the equation?

A 3.13×10^{-29} J

B 9.39×10^{-21} J

C 2.82×10^{-12} J

D 8.45×10^{-4} J

END OF QUESTION PAPER

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

NAMA CALON :

4531/2
Physics
Kertas 2
September 2008
2½ jam

NO. KAD PENGENALAN

ANGKA GILIRAN

ZON A BAHAGIAN GABUNGAN KUCHING
PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA

2008

PHYSICS

Kertas 2

Dua jam tiga puluh minit

**(You are advised to spend 90 minutes for Section A,
30 minutes for Section B dan 30 minutes for Section C)**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis Nombor Kad Pengenalan dan Angka Giliran anda pada ruang yang disediakan.*

2. *Kertas soalan ini adalah dalam bahasa Inggeris.*

3. *Calon dikehendaki membaca maklumat di halaman 2.*

Kod Pemeriksa			
Bahagian	*Soalan*	*Markah penuh*	*Markah diperoleh*
A	1	4	
	2	5	
	3	6	
	4	7	
	5	8	
	6	8	
	7	10	
	8	12	
B	9	20	
	10	20	
C	11	20	
	12	20	
Jumlah			

Kertas soalan ini mengandungi 28 halaman bercetak

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

INFORMATION TO CANDIDATES

1. *This question paper consists of* **three** *sections*: **Section A**, **Section B** *and* **Section C**.

2. *Answer* **all** *questions in* **Section A**. *Write your answers for* **Section A** *in the spaces provided on the question paper.*

3. *Answer* **one** *question from* **Section B** *and* **one** *question from* **Section C**. *Write your answers for* **Section B** and **Section C** *on the lined pages at the end of this question paper. Answer questions in* **Section B** *and* **Section C** *in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.*

4. *Show your working, it may help you to get marks.*

5. *If you wish to cancel any answer, neatly cross out the answer.*

6. *The diagrams in the questions provided are not drawn to scale unless stated.*

7. *A list of formulae is provided on page* **3.**

8. *The marks allocated for each question or part question are shown in brackets.*

9. *The time suggested to complete* **Section A** *is* 90 *minutes,* **Section B** *is* 30 *minutes and* **Section C** *is* 30 *minutes.*

10. *You may use a non-programmable scientific calculator.*

11. *Hand in all your answer sheets at the end of the examination.*

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

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

1. $a = \frac{v-u}{t}$

2. $v^2 = u^2 + 2as$

3. $s = ut + \frac{1}{2}at^2$

4. Momentum = mv

5. $F = ma$

6. Kinetic energy = $\frac{1}{2}mv^2$

7. Potential energy = mgh

8. Elastic potential energy = $\frac{1}{2}Fx$

9. Power, $P = \frac{\text{energy}}{\text{time}}$

10. $\rho = \frac{m}{V}$

11. Pressure, $p = h\rho g$

12. Pressure, $p = \frac{F}{A}$

13. Heat , $Q = mc\theta$

14. Heat, $Q = mL$

15. $\frac{PV}{T} = \text{constant}$

16. $n = \frac{\sin i}{\sin r}$

17. $n = \frac{\text{real depth}}{\text{apparent depth}}$

18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

19. Linear magnification, $m = \frac{v}{u}$

20. $v = f\lambda$

21. $\lambda = \frac{ax}{D}$

22. $Q = It$

23. $E = VQ$

24. $V = IR$

25. Power, $P = IV$

26. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

27. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$

28. $E = mc^2$

29. g = 10 m s^{-2}

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

Section A

[60 *marks*]

Answer **all** *questions in this section.*

1. Diagram 1.1 shows a pair of vernier calipers with the jaws closed.

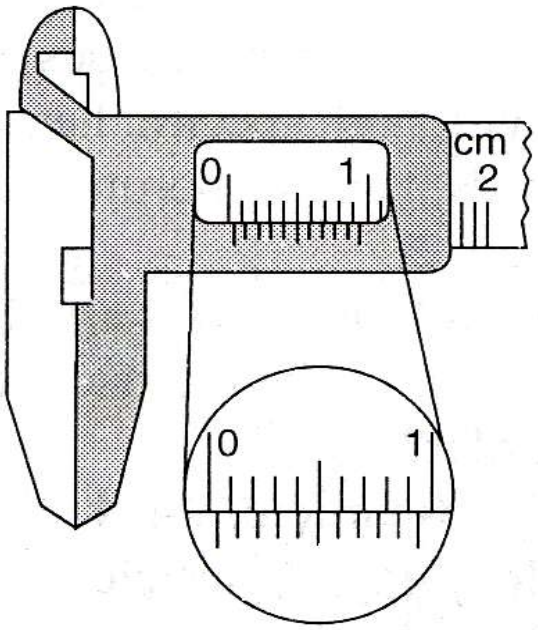


Diagram 1.1

(a) What is the value of the zero error reading?

.....

[1 *mark*]

1(a)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

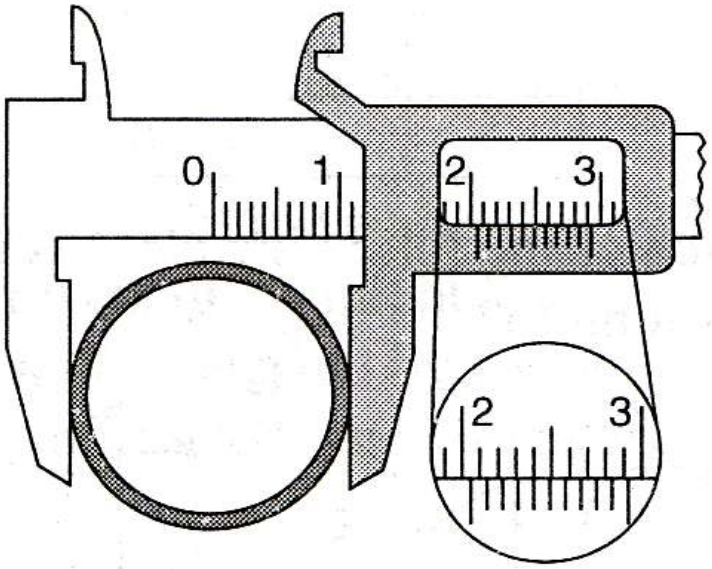


Diagram 1.2

(b) Diagram 1.2 shows the same pair of vernier calipers being used to measure the external diameter of a water pipe.

(i) Determine the reading of the external diameter of the water pipe as in Diagram 1.2.

1(b) (i)

.....

[1 *mark*]

(ii) Hence, determine the **actual** external diameter of the water pipe.

1(b)(ii)

[2 *marks*]

Q1.Total

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

2. Diagram 2 shows an electric circuit used in household electric wiring by an inexperienced electrician..

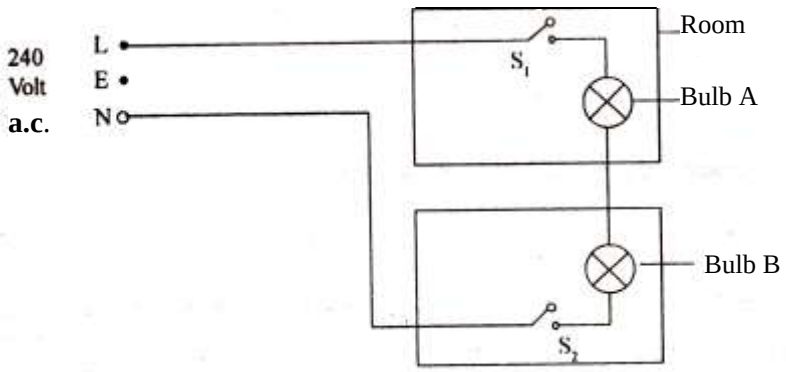


Diagram 2

Both bulbs A and B are identical, with a resistance of 500 Ω each.

(a) (i) Name the type of circuit used in the wiring above.

2(a)(i)

[1 *mark*]

(ii) State what happens to bulbs A and B if only switch S_1 is switched on.

.....

.....

2(a)(ii)

[1 *mark*]

(b) If you wish to light up bulb A, explain what needs to be done.

.....

.....

2 (b)

[1 *mark*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(c) Both switches S_1 and S_2 in the circuit were switched on.

Calculate the value of the current flowing in bulbs A and B.

2(c)

[2 *marks*]

Q2.Total

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

3. Diagram 3 shows a bar magnet with its north pole at point P.

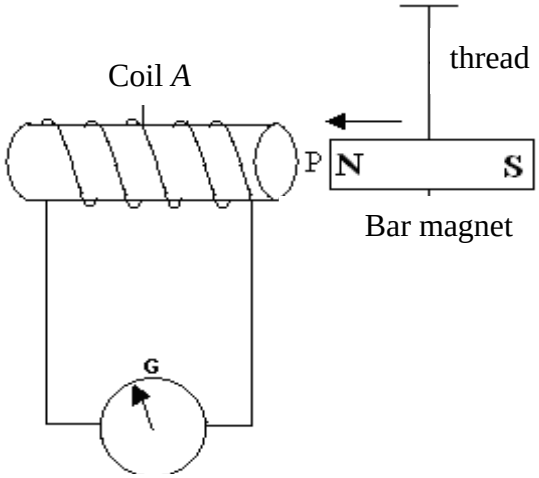


Diagram 3

(a) (i) When the magnet is moved towards coil *A*, there is a deflection in the galvanometer. What does this indicate?

.....

[1 *mark*]

3(a)(i)

(ii) Mark on Diagram 3 your answer in (a)(i). [1 *mark*]

3(a) (ii)

(b) What is the polarity at the end *P* when the magnet is moved towards coil *A*?

.....

[1 *mark*]

3(b)

(c) What is the relationship between the number of turns and the magnitude of induced current?

.....

[1*mark*]

3 (c)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(d) Name the law involved in (c).

3 (d)

.....

[1*mark*]

(e) What can be done to increase the reading in the galvanometer?

3 (e)

.....

[1*mark*]

Q3.Total

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

4. Diagram 4 shows air bubbles formed by an air pump in an aquarium.

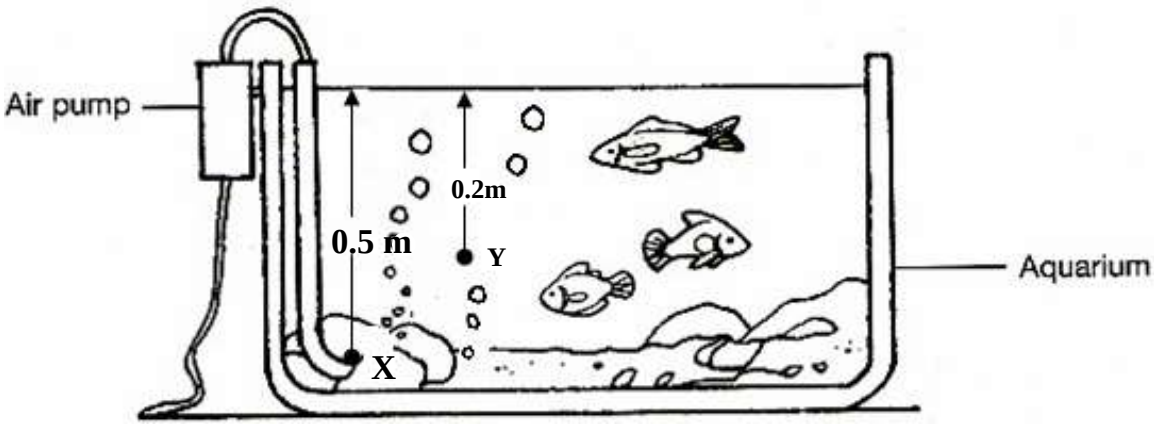


Diagram 4

(a) Name the gas law involved in the situation in Diagram 4.

.....

[1 *mark*]

4(a)

(b) State the relationship between the pressure and the volume of a gas at constant temperature.

.....

[1 *mark*]

4(b)

(c) Using the kinetic theory of gases, explain why the volume of the bubble increases when it rises from the bottom of the aquarium to the water surface.

.....

.....

.....

.....

[3 *marks*]

4(c)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(d) What is the volume of the air bubble at Y if its volume at X is 6.0 cm^3?

[Atmospheric pressure = 10 m of water.]

4(d)

[2 *marks*]

Q4.Total

5 Diagram 5.1 and Diagram 5.2 show two long glass cylinders, in which a feather of 2 g mass and a small ball bearing of 30 g mass are dropped simultaneously from the same height. It is noted that both the feather and ball bearing fall to the base of the containers. Diagram 5.1 shows all the air is removed from the container.

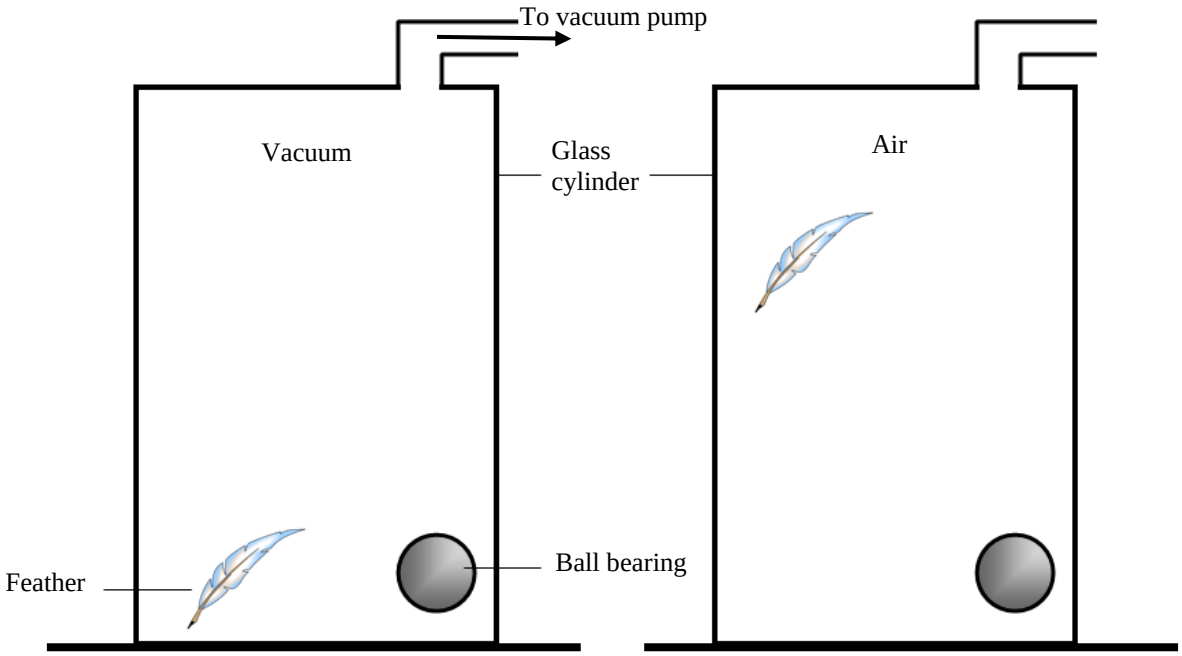


Diagram 5.1 Diagram 5.2

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(a) Observe Diagram 5.1 and Diagram 5.2

(i) Compare the time taken by the feather and the ball bearing to reach the base of the glass cylinders.

……..

……... 5(a)(i)

[1 *mark*]

(ii) Name one factor which causes the outcome in Diagram 5.2.

……... 5(a)(ii)

[1 *mark*]

(b) (i) In Diagram 5.1, what happens to the falling time if the feather and ball bearing have the same mass?

……... 5(b)(i)

[1 *mark*]

(ii) Explain your answer in **5**(b)(i)

……... 5 (b)(ii)

[1 *mark*]

(iii) State the phenomenon involved.

…….. 5(b)(iii)

[1 *mark*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(c) If the same setting in Diagram 5.1 is placed on the surface of the Moon where its acceleration due to gravity is $\frac{1}{6}$ that of the Earth,

(i) state the difference in the time taken for the ball bearing to fall to the base of the cylinder.

.....

[1 *mark*]

5(c)(i)

(ii) Calculate the new weight of the ball bearing on the Moon.

[2 *marks*]

5(c)(ii)

Q5.Total

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

6. Diagram 6 shows a rod hanging onto a spring. The spring oscillates at a frequency of 5 oscillations per second. The rod at the end of the spring touches the surface of the water in a ripple tank and produces a series of plane waves. The pattern of the waves is seen through a stroboscope.

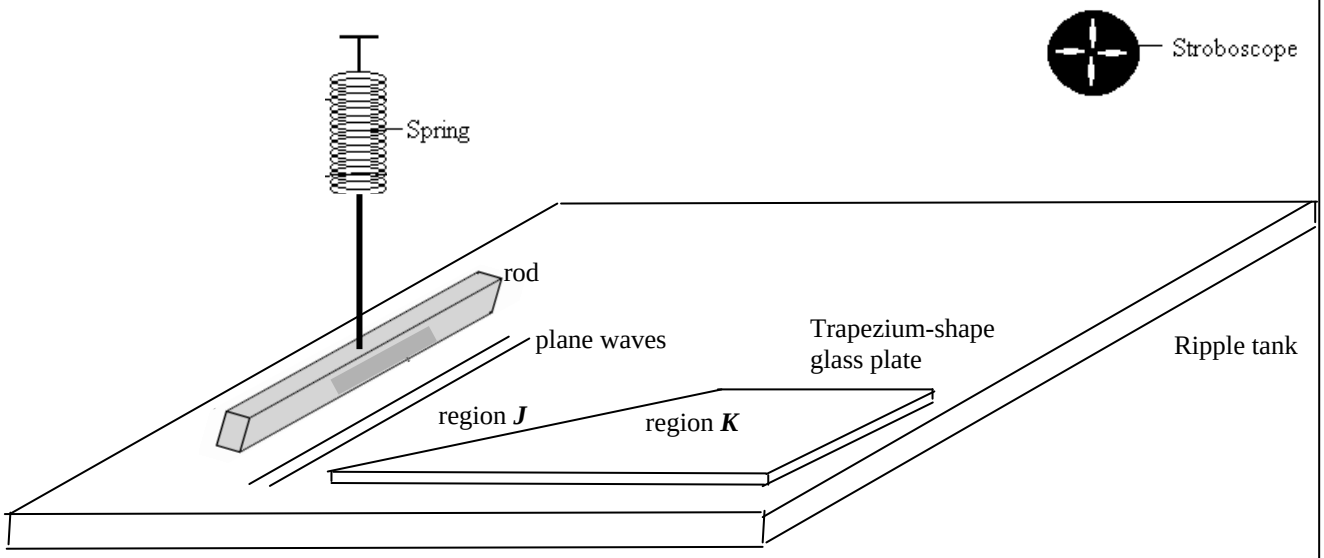


Diagram 6

(a) What is the value of the frequency of the waves?

.....

[1 *mark*]

6(a)

(b) Compare the depth of water in region ***J*** and region ***K***.

.....

[1 *mark*]

6(b)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(c) As the waves travel from region ***J*** to region ***K***, what happens to

(i) the frequency of the waves?

……..

[1 *mark*]

6(c)(i)

(ii) the wavelength of the waves?

……..

[1 *mark*]

6(c)(ii)

(iii) the speed of the waves?

……..

[1 *mark*]

6(c)(iii)

(iv) the direction of the waves?
(Draw a diagram in the space below to illustrate your answer.)

[1 *mark*]

6(c)(iv)

(d) State the relationship between the depth of water and the wavelength of the waves?

……..

[1 *mark*]

6(d)

(e) Name the phenomenon that has taken place as the waves travel from region ***J*** to region ***K***.

……..

[1 *mark*]

6(e)

Total Q6

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

7. Diagram 7 shows a line PQ drawn passing through a convex mirror. An object is placed in front of the mirror. F is the focal point of the mirror and Q is the centre of curvature.The radius of curvature of the convex mirror is 12 cm.

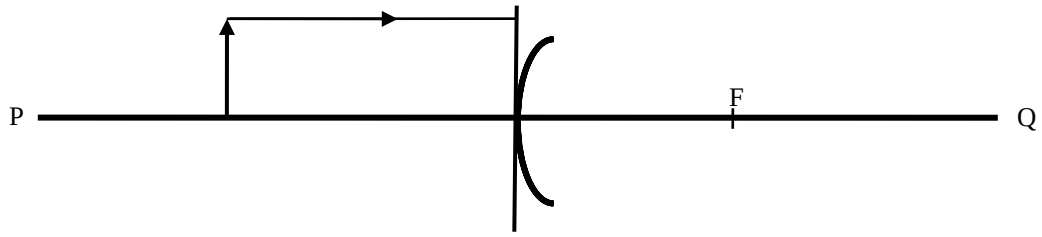


Diagram 7

(a) Name the line PQ.

.....

[1 *mark*] 7(a)

(b) What is the focal length of the convex mirror ?

.....

[1 *mark*] 7(b)

(c) Complete the ray diagram to show the position of the image formed by the mirror.

[2 *marks*] 7(c)

(i) State the characteristics of the image formed.

.....

[2 *marks*] 7(c)(i)

(ii) Give **two** reasons why a convex mirror is more suitable to be used as rear-view mirror of a car than a plane mirror.

.....

.....

[2 *marks*] 7(c)(ii)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(d) A dentist uses a type of curved mirror to examine a patient's teeth.

(i) Name the type of curved mirror used by the dentist.

.....

[1 *mark*]

7(d)(i)

(ii) Give one advantage of using the type of mirror named in 7(d)(i).

.....

[1 *mark*]

7(d)(ii)

Total Q7

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

8. Diagram 8 shows a transistor circuit with a bulb *L*.
The bulb *L* will only light up if the potential difference across *YZ* is at least 1.0 V.

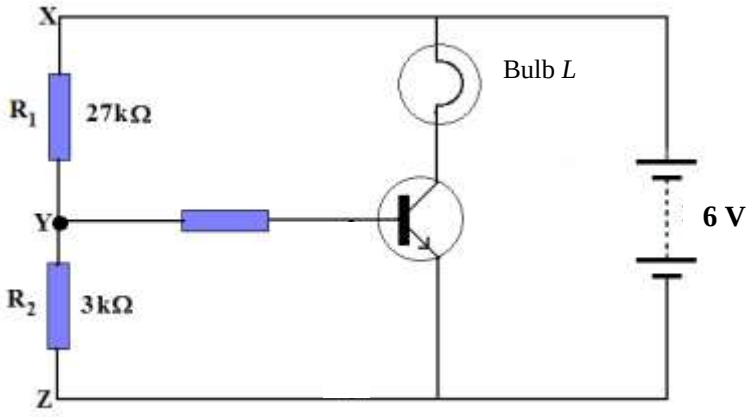


Diagram 8

(a) Name the type of transistor shown in Diagram 8.

.....
[1 *mark*]

8(a)

(b) Based on Diagram 8 :

(i) What is the potential difference across points X and Z?

.....
[1 *mark*]

8(b)(i)

(ii) What is the effective resistance between points X and Z?

.....
[1 *mark*]

8(b)(ii)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(iii) Using the answers from (b)(i) and b(ii), calculate the potential difference across *YZ*.

8(b)(iii)

[2 *marks*]

(c) State what will happen to the lamp, *L*. Explain your answer.

.....

.....

.....

8(c)

[3 *marks*]

(d) A building needs to install an automatic fire alarm system.

To design an automatic fire alarm system, suggest **two** modifications that have to be made to the circuit in Diagram 8 by replacing the components with suitable electronic components.

.....

.....

8(d)

[2 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(e) A consumer would like to modify the circuit so that he can use it as an automatic porch light system.

He would like the bulb to be switched on in the dark but switched off in bright daylight automatically.

(i) Suggest a component that can be used.

(ii) Describe briefly how the component in (e)(i) is used in the circuit.

.....

.....

.....

[2 *marks*]

8(e)

Total Q8

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Section B

[20 *marks*]

Answer any **one** *question from this section.*

The time suggested to answer this section is **30** *minutes.*

9 Diagram 9.1 shows an ice cube melting when heat is absorbed from the surroundings.
Diagram 9.2 shows a kettle of water boiling when heat is absorbed from the flame.

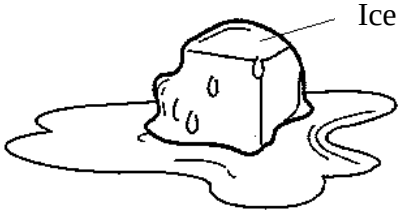


Diagram 9.1

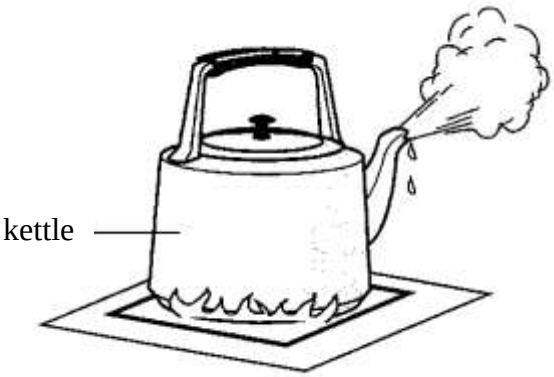


Diagram 9.2

(a) What is meant by specific latent heat?

[1 *mark*]

(b) Using Diagram 9.1 and Diagram 9.2, compare the processes that take place in both situations and the type of heat needed for both processes to occur.
Relate the processes with the type of heat needed to deduce a relevant physics concept. Name the physics concept involved.

[5 *marks*]

(c) (i) Your body sweats when you are feeling hot. How does sweating help to cool down your body?

[2 *marks*]

(ii) Explain why a scald from steam is more serious than the one from boiling water.

[2 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(d) Diagram 9.3 shows a simple solar water-heating system. Energy from the sun falls on the solar panel. Water is pumped around the system so that a store of hot water is made available in the tank.

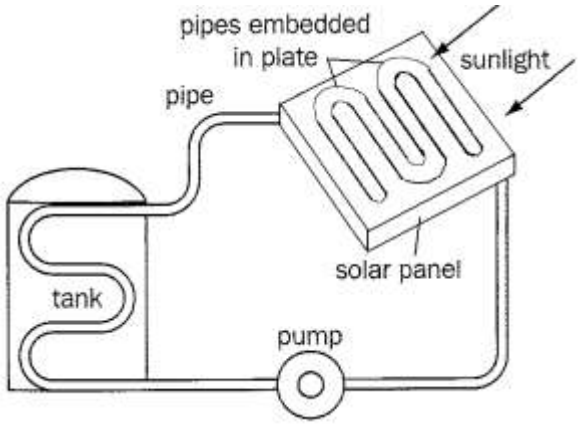


Diagram 9.3

Using suitable physics concepts, explain the required modification needed in designing an efficient solar water-heating system. The modification should include the following aspects :

(i) pipes design

(ii) material used

(iii) heat absorption

[10 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

10 Diagram 10.1 and Diagram 10.2 show two identical resistors which have resistance *R* connected to the ammeters, voltmeters, switches and batteries in different ways.

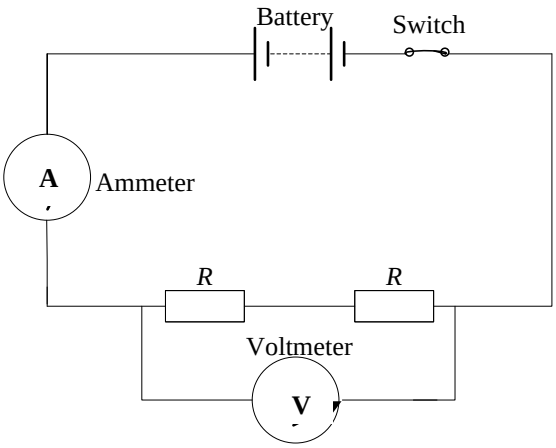


Diagram 10.1

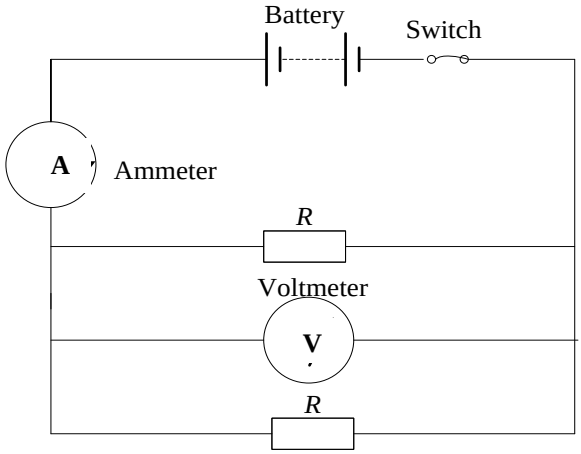


Diagram 10.2

When the switch is on, the ammeters and the voltmeters show a reading.

(a) What is meant by current?

[1 *mark*]

(b) With reference to Diagram 10.1 and Diagram 10.2, compare the type of circuit connections, the reading of ammeters, the reading of voltmeters and the effective resistance of the circuits.

Relate the current flow in a circuit with the effective resistance to make a deduction regarding the relationship between the type of circuit connection and the effective resistance.

[6 *marks*]

(c) One identical resistor is connected parallel to the resistors in Diagram 10.2. Explain what happens to the reading of the ammeter and voltmeter.

[3 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(d) Diagram 10.3 shows the lamps in a domestic lighting circuit connected in parallel.

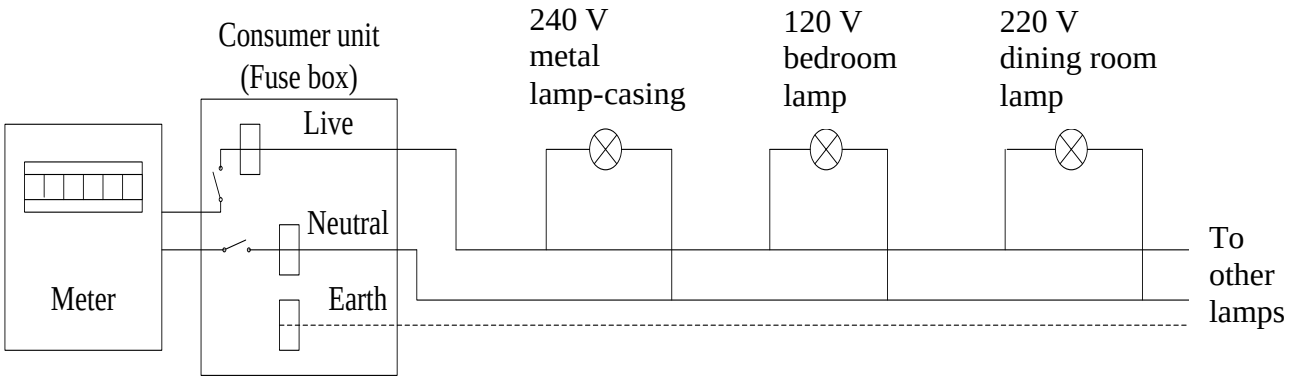


Diagram 10.3

The circuit is not complete, not efficient for electrical energy consumption and lacks safety features.

Suggest modifications that needs to be done to the circuit to :

(i) improve safety,

(ii) produce normal brightness in the lamps, and

(iii) to increase the efficiency of electrical energy consumption.

[10 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Section C

[20 *marks*]

Answer any **one** *question from this section.*

The time suggested to answer this section is **30** *minutes.*

11. Diagram 11.1 below shows a simple hydraulic brake system in a car.

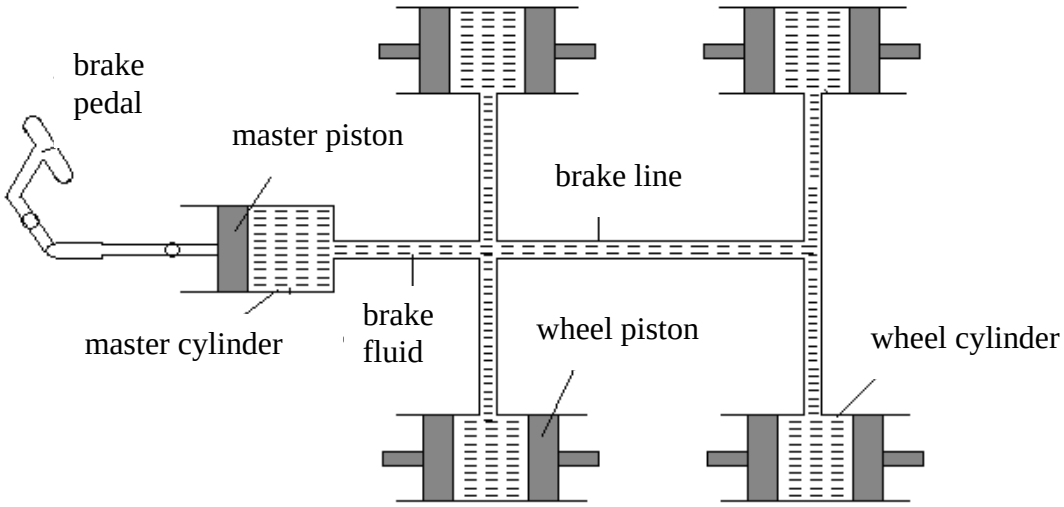


Diagram 11.1

Table 11.1 shows certain characteristics of a brake system.

Brake System	Type of brake fluid	Thickness of brake line	The ratio of the cross sectional area for wheel and master piston.	Type of brake for the front and rear wheel.	
				Front wheel	Rear wheel
P	Oil	Thin	High	Disc	Drum
Q	Oil	Thick	Low	Disc	Drum
R	Paraffin	Thin	High	Drum	Disc
S	Oil	Thick	High	Disc	Drum
T	Water	Thick	Low	Drum	Disc

Table 11.1

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(a) (i) What is meant by Pascal's Principle?

[1*mark*]

(ii) You are asked to investigate the characteristics of the materials in Table 11.1 which could be used to make an efficient brake hydraulic system. Justify your choice.

[10 *mark*s]

(b) Diagram 11.2 shows a simple hydraulic machine used for lifting heavy loads such as cars in a garage. It consists of two pistons, X and Y of cross sectional area 0.02 m^2 and 0.28 m^2, respectively. When piston X is pressed down by applying a force of 15 N, a large force is produced on piston Y.

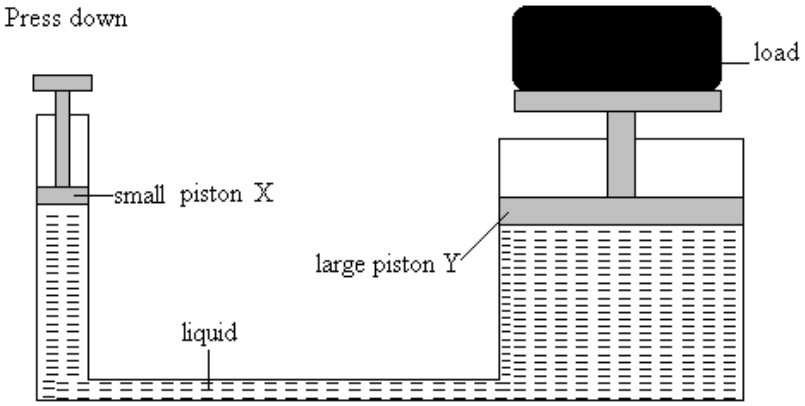


Diagram 11.2

(i) Explain briefly how the load can be lifted up when the small piston X is pressed down.

[4 *marks*]

(ii) Calculate the pressure exerted on the liquid by piston X.

[1 *mark*]

(iii) Calculate the maximum load that can be lifted by piston Y.

[2 *marks*]

(iv) If piston X is pressed downwards by a distance of 21 cm, what is the distance moved by piston Y?

[2 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

12 (a) The water supply to your school is from a large storage tank situated in the school compound. There is a sudden drop in the water pressure at the taps in your school. You suspect that this could be due to a big leak in the underground water pipes. Table 12 gives the list of materials and equipment that could be used to locate the leak.

Radioactive source	Radiation emitted	Half-life
P	α	16 hours
Q	β	20 days
R	β	15 hours
S	γ	40 minutes

Detector
Spark counter Cloud chamber Geiger-Muller tube Radiation badge

Counter
Scaler Ratemeter

Table 12

(i) What is meant by half-life? [1 *mark*]

(ii) Explain the suitability of the radioactive source, the detector and the counter to be used to locate the leak and to detect the radiation emitted. Justify your choice.

[10 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(b) X, Y and Z are three different radioactive substances. It is known that one of them emits only α-particles, another emits only β-particles, and the third emits only γ-radiation.

You are required to carry out an investigation to identify the type of radiation emitted by the three types of substances.

(i) Draw a diagram to show how you would carry out the investigation.

(ii) Describe the procedure and explain how you arrive at the conclusion.

[7 *marks*]

(c) State **two** precautions that should be taken when handling or storing radioactive substances.

[2 *marks*]

END OF QUESTION PAPER

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

SULIT
4531/3
Physics
Paper 3
1 ½ jam

NAMA CALON :

4531/3

NO. KAD PENGENALAN

ANGKA GILIRAN

ZON A BAHAGIAN GABUNGAN KUCHING

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA

2008

PHYSICS

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis* **nombor kad pengenalan** *dan* **angka giliran** *anda pada ruang yang disediakan.*

2. *Kertas soalan ini adalah dalam bahasa Inggeris*

3. *Calon dikehendaki membaca maklumat di halaman 14.*

Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 14 halaman bercetak

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Section A
[28 *marks*]

Answer **all** *questions in this section.*

1. An experiment to investigate the relationship between the mass of sand, *m* and the length of a cylinder submerged in a liquid, *l*, has been carried out using the apparatus and material as shown in Diagram 1.1. A graph paper is inserted into the cylinder to act as a ruler.

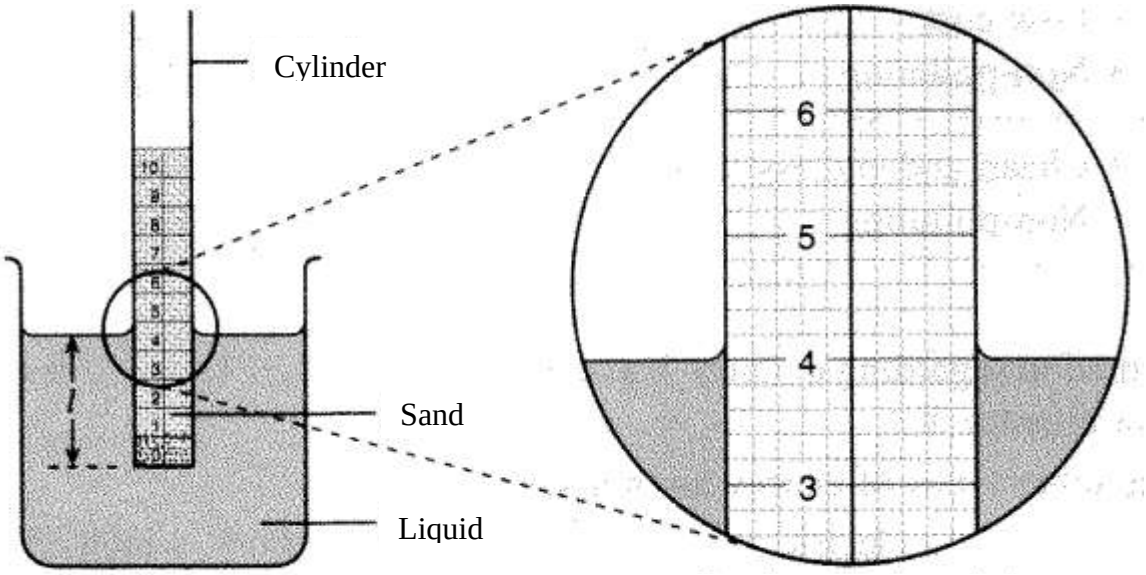


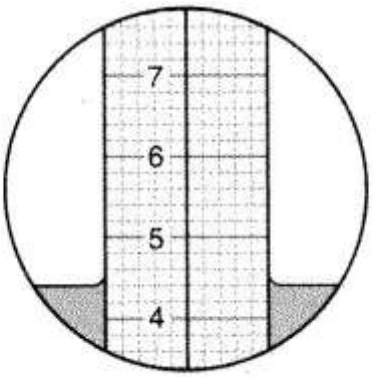
Diagram 1.1

Sand of mass, *m* equal to 10 g is put into the cylinder and submerged in the liquid. The actual corresponding reading of the length of the cylinder submerged in the liquid, *l* is shown in Diagram 1.2.

The procedure of the experiment is repeated with masses, *m* = 20 g, 30 g, 40 g and 50 g.

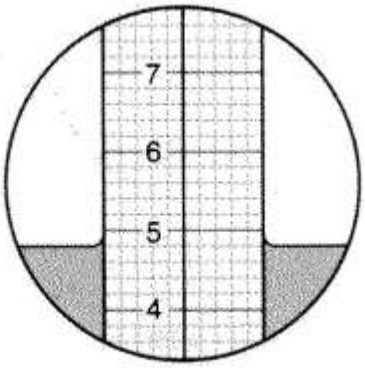
The actual corresponding readings of the lengths of the cylinder submerged in the liquid, *l*, are shown in Diagram 1.3, 1.4, 1.5 and 1.6.

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/



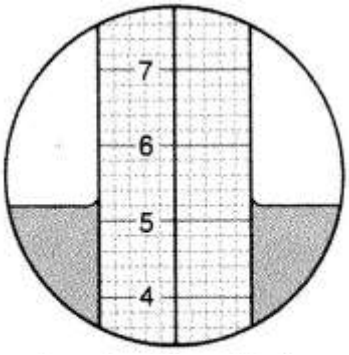
Length of the cylinder submerged for 10 g of sand

Diagram 1.2



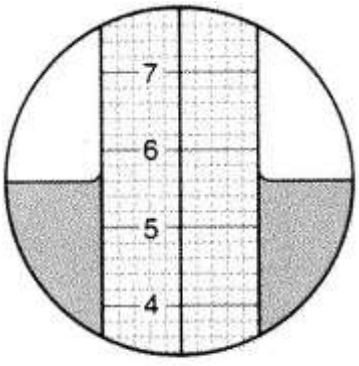
Length of the cylinder submerged for 20 g of sand

Diagram 1.3



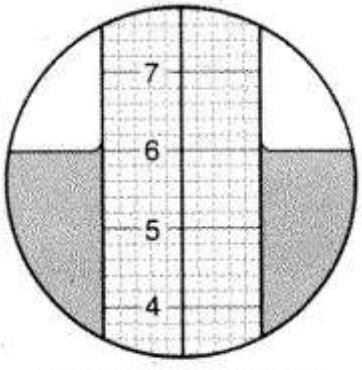
Length of the cylinder submerged for 30 g of sand

Diagram 1.4



Length of the cylinder submerged for 40 g of sand

Diagram 1.5



Length of the cylinder submerged for 50 g of sand

Diagram 1.6

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(a) Based on the experiment described on pages 2 and 3, identify :

(i) the manipulated variable, 1(a)(i)

……..

[1 *mark*]

(ii) the responding variable, 1(a)(ii)

……..

[1 *mark*]

(iii) the constant variable. 1(a)(iii)

……..

[1 *mark*]

(b) (i) In Diagram 1.2, show the position of the eye when taking the reading of the length of the cylinder submerged in liquid. 1(b)(i)

[1 *mark*]

(ii) Based on Diagram 1.2, 1.3, 1.4, 1.5 and 1.6, record the readings of *l* and *m*. Tabulate your results for *l* and *m* in the space below. 1(b)(ii)

[5 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(c) On the graph paper on page 6, plot the graph of l against m.

[5 *marks*]

1(c)

(d) Based on your graph, state the relationship between l and m.

……

[1 *mark*]

1(d)

(e) State *one* modification that you would make to the cylinder so that the results obtained in the experiment are more accurate.

……

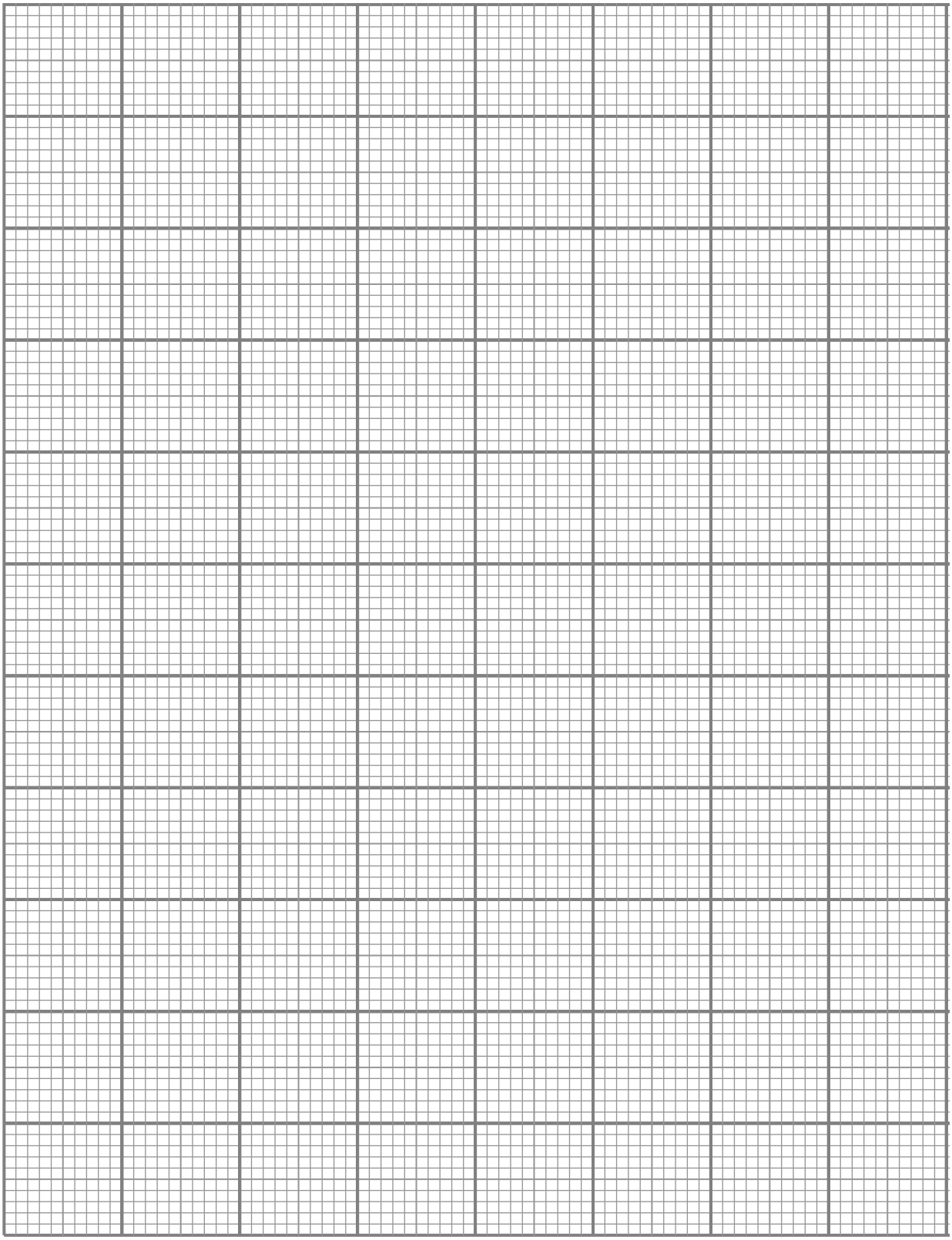
……

[1 *mark*]

1(e)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Graph of l against m



Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

2. A student carried out an experiment to study how the fringe separation, x, varies with the distance between two coherent sources, a, for water waves. The student adjusted the distance between two coherent sources, a, on a straight line. The corresponding values of x are recorded at a fixed distance, D = 30 cm from the coherent source throughout the experiment. The student then plotted a graph of $\frac{1}{x}$ against a as shown in Diagram 2.

Graph of $\frac{1}{x}$ against a

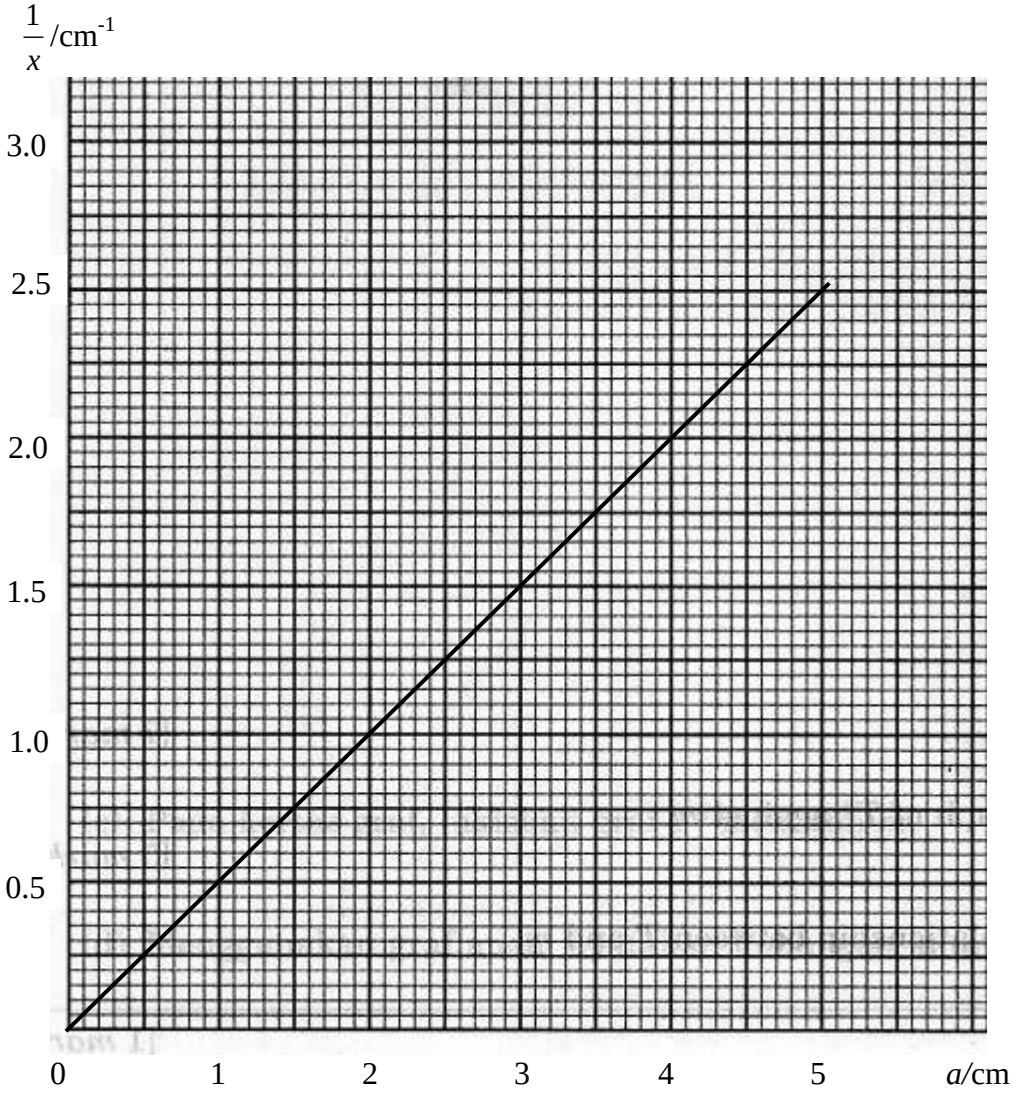


Diagram 2

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

For Examiner's Use

(a) Based on the graph in Diagram 2

(i) what happens to x as a increases?

_____

[1 *mark*]

2*(a)(i)*

(ii) determine the fringe separation, x, formed if the distance between the two coherent sources, a = 3 cm. Show on the graph how you would determine the value of x.

[3 *marks*]

2*(a)(ii)*

(iii) calculate the gradient of the graph.
Show on the graph how you determine the gradient of the graph.

[3 *marks*]

2*(a)(iii)*

(b) Using the value of the gradient obtained in (a)(iii), and the equation $\lambda = \frac{ax}{D}$

determine the wavelength, λ, of the water wave which is used in this experiment.

[3 *marks*]

2(*b*)

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

(c) State **one** modification that can be made to this experiment so that the fringe separation *x* can be increased.

For Examiner's Use

_____

_____

[1 *mark*]

2*(c)*

(d) State **one** precaution that should be taken during this experiment.

_____

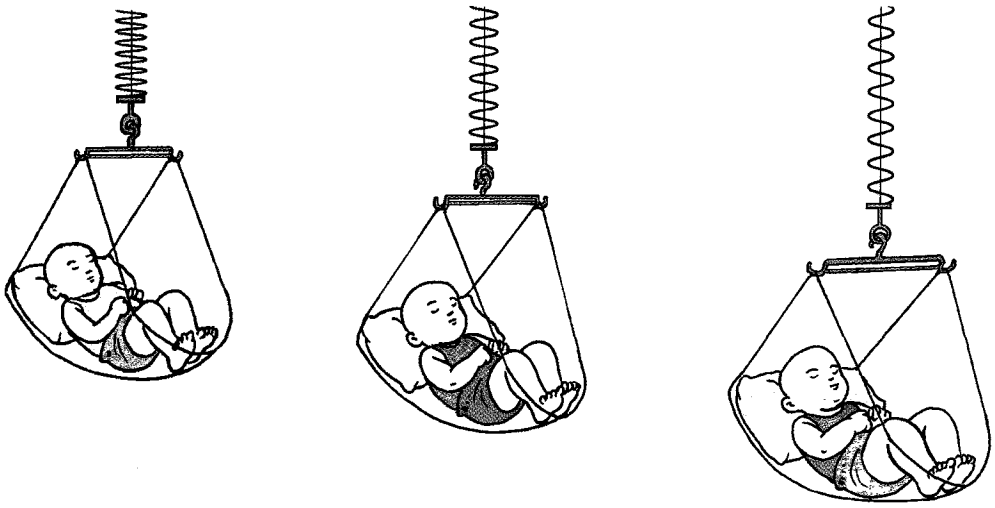
_____

[1 *mark*]

2*(d)*

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

3.



Based on the observation above,

(a) State **one** suitable inference.

[1 *mark*]

(b) State **one** hypothesis that could be investigated.

[1 *mark*]

(c) With the use of apparatus such as a metre rule, spring and other apparatus, describe an experimental framework to investigate the hypothesis stated in 3(b).

In your description, state clearly the following :

(i) The aim of the experiment.

(ii) The variables in the experiment.

(iii) The list of apparatus and materials.

(iv) The arrangement of the apparatus.

(v) The procedure used in the experiment.

Describe how to control and measure the manipulated variable and how to measure the responding variable.

(vi) The way to tabulate the data.

(vii) The way to analyse the data.

[10 *marks*]

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

4 Diagram 4.1 and Diagram 4.2 show wire coils connected to the ammeter, switch and d.c. power supply. The pattern of the iron filings is formed when the switch is on.

Diagram 4.2 shows that the pattern of iron filings formed is denser when the reading of the ammeter is higher.

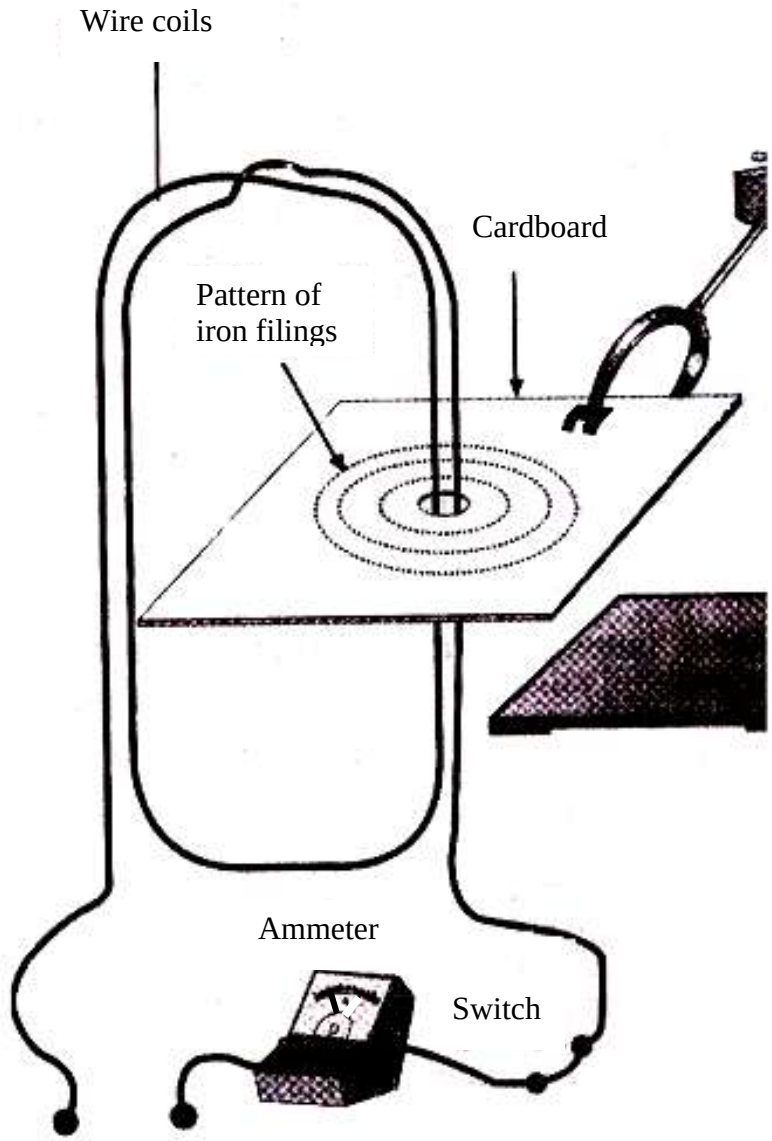


Diagram 4.1

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

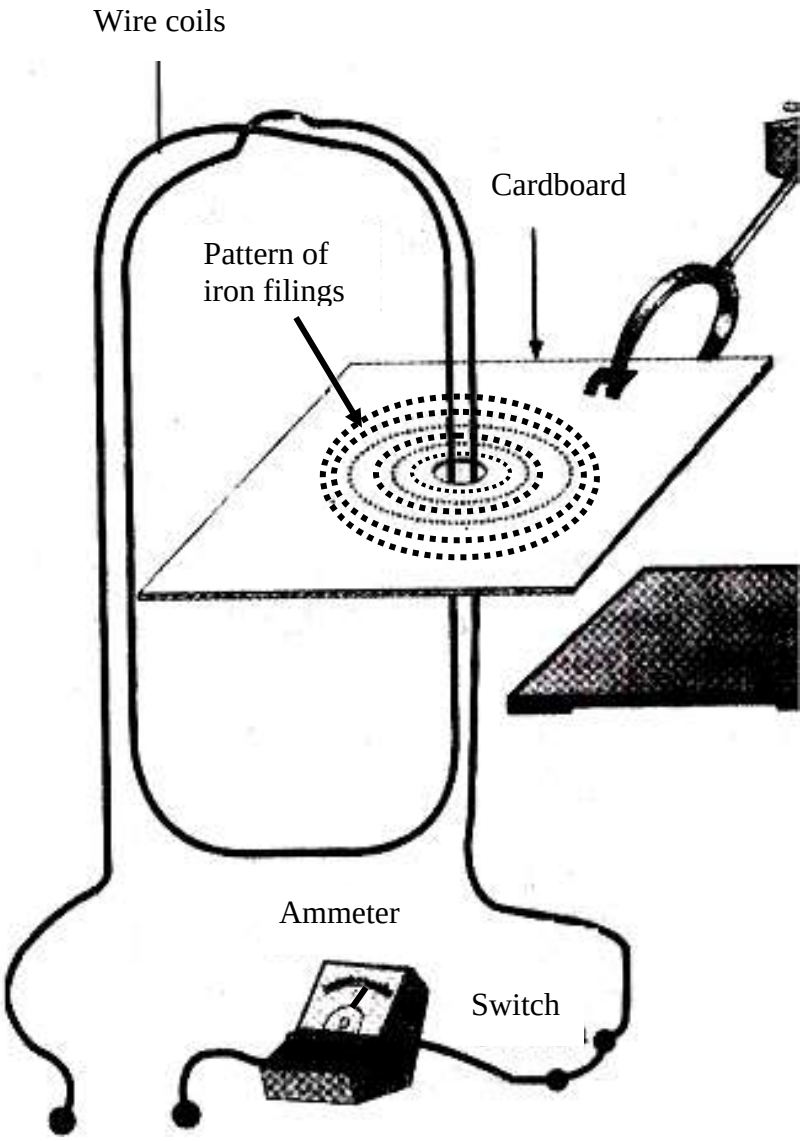


Diagram 4.2

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Based on the observation on Diagram 4.1 and Diagram 4.2 and using your knowledge of electromagnetism:

(a) State **one** suitable inference. [1 *mark*]

(b) State **one** hypothesis that could be investigated. [1 *mark*]

(c) With the use of apparatus such as soft iron core, insulated cooper wire, ammeter and other apparatus, describe an experiment to investigate the hypothesis stated in 4(b).

In your description, state clearly the following :

(i) The aim of the experiment.

(ii) The variables in the experiment.

(iii) The list of apparatus and materials.

(iv) The arrangement of the apparatus.

(v) The procedure used in the experiment.
Describe how to control and measure the manipulated variable and how to measure the responding variable.

(vi) The way to tabulate the data.

(vii) The way to analyse the data.

[10 *marks*]

END OF QUESTION PAPER

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

INFORMATION TO CANDIDATES

1. *This question paper consists of two sections :* **Section A** *and* **Section B.**

2. *Answer all questions in* **section A**. *Write your answers for* **section A** *in the space provided in the question paper.*

3. *Answer one question from* **section B**. *Write your answers for* **section B** *on the lined pages at the end of this question paper in detail. Answer one question in* **section B**. *You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.*

4. *Show your working. It may help you to get marks.*

5. *If you wish to cancel any answer, neatly cross out the answer. Do not use liquid paper.*

6. *The diagrams in the questions provided are not drawn to scale unless otherwise stated.*

7. *The marks allocated for each question or part question are shown in brackets.*

8. *You may use a non-programmable scientific calculator.*

9. *The time suggested to answer* **section A** *is 60 minutes and* **section B** *is 30 minutes.*

10. *Hand in your answer sheets at the end of the examination.*

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

Answer for Physics 1 Zone A 2008

Question No	Answer
1	B
2	D
3	D
4	B
5	B
6	D
7	B
8	A
9	B
10	C
11	B
12	B
13	B
14	A
15	C
16	D
17	A
18	B
19	B
20	C
21	D
22	A
23	C
24	A
25	D

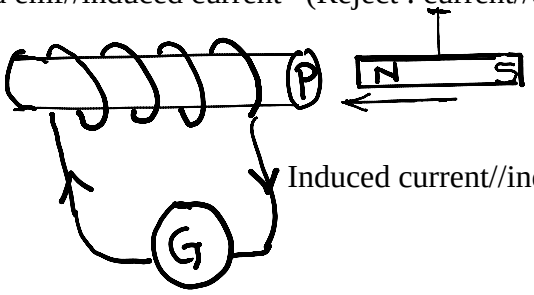
Question No	Answer
26	D
27	C
28	D
29	A
30	B
31	B
32	C
33	D
34	B
35	D
36	B
37	D
38	D
39	A
40	C
41	A
42	A
43	D
44	D
45	D
46	A
47	C
48	D
49	D
50	C

ANSWER	NO OF QUESTION
A	10
B	14
C	9
D	17
TOTAL	50

ZONE A BAHAGIAN GABUNGAN KUCHING
SPM TRIAL EXAMINATION 2008
MARKING SCHEME
Physics Paper 2

Question No.	Answer	Marks
1 (a)	Zero error = +0.04 cm //0.04 cm	1
(b)(i)	2.04 cm	1
(c)	Actual diameter of the water pipe = 2.04 cm – 0.04 cm = 2.00 cm	1 1
	Total marks	**4**

2 (a)	i) Series circuit ii) Both bulbs A & B do not light up iii) Both switches S_1 & S_2 are closed	1 1 1
(b)	R = 500Ω + 500Ω = 1000 Ω or I = $\frac{240\ V}{1000\ \Omega}$ I = 0.24 A	1 1
	Total marks	**5**

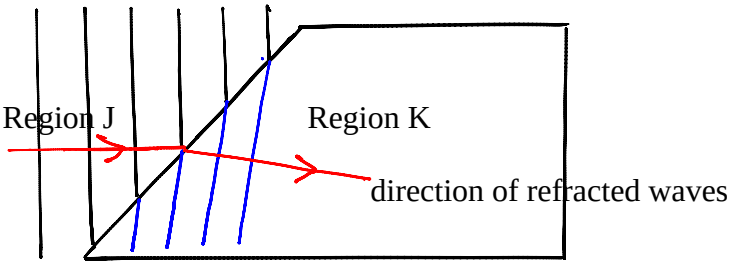
3. (a) (i) (ii)	Induced emf//induced current (Reject : current//emf)  Induced current//induced emf	1 1
(b)	P = North	1
(c)	The larger the number of turns, the higher the induced current produced.	1

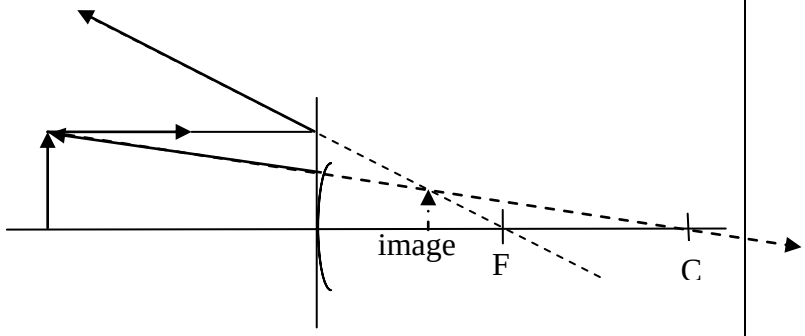
(d)	Faraday's Law	1
(e)	Increase the speed of the relative motion between the coil and the magnet // Use a stronger magnet//bigger number of turns on the coil	1
	Total marks	**6**

Question No.	**Answer**	**Marks**
4.(a)	Boyle's Law	1
(b)	As pressure decreases, volume increases//Vice versa// Pressure of the gas is inversely proportional to its volume (provided the temperature is constant)	1
(c)	• For a gas at constant temperature, the kinetic energy of its molecules is constant//average speed of the molecules is constant • as the bubble rises, its pressure decreases; this means that the frequency of collisions between the molecules and the walls of the bubble decreases • this means that the volume of the bubble increases	1 1 1
(d)	$P_X V_X = P_Y V_Y$ $(10.5)(6.0) = (10.2)\ V_Y$ $V_Y = 6.18\ cm^3$ or $6.2\ cm^3$ (Reject the final answer if the unit is not written.)	1 1
	Total marks	**7**

Question No	Answer	Marks
5.(a)(i)	• The feather and ball bearing fall at the same rate in Diagram 5.1 while the feather falls slower than ball bearing in Diagram 5.2 • Air resistance	1
(ii)		1
(b)(i)	• Still the same	1
(ii)	• The falling time is influenced by the same acceleration due to gravity	1
(iii)	• Free fall	1
(c)(i)	• The falling time of the ball bearing on Moon is slower/greater/bigger than ball bearing on Earth The weight of ball bearing on Earth:	1
(ii)	W = *mg* = (0.03)(10) = 0.3 N The weight of ball bearing on Moon: $0.3\text{ N} \times \frac{1}{6} = 0.05\text{ N}$ OR $W = (0.03)(\frac{1}{6} \times 10)$ = 0.05 N	1 or 1 1
	Total marks	**8**

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

6 (a)	5 Hz	1
(b)	J is deeper than K	1
(c) (i)	Frequency is constant	1
(ii)	Wavelength decreases	1
(iii)	Speed decreases	1
(iv)		1
(d)	As the depth of water increases, the wavelength increases	1
(e)	Refraction	1
	Total marks	**8**

Question No.	Answer	Marks
7(a)	Principal axis	1
(b)	6 cm	1
(c)		2
(c) (i)	Virtual, upright and diminished	2
(ii)	• Larger field of vision. • Image formed always upright and behind the mirror for any object distance.	2
(d) (i)	Concave mirror	1
(ii)	Image is enlarged and upright for object distance less than the focal length.	1
	Total marks	**10**

8 (a)	n-p-n transistor	1
(b)(i)	6 V	1
(ii)	27 + 3 = 30 kΩ	1
(iii)	$V_{YZ} = \frac{3}{3+27} \times 6\ V$ = 0.6 V	1 1
(c)	• Lamp L will not glow • because the voltage across *YZ* (i.e. 0.6 V) is less than the base-emitter potential difference of 1.0 V • No base current flows • No collector current flows	1) Maximum 2
(d)	• Resistor R_1 is replaced by a thermistor. • Lamp L is replaced by an electric bell.	1 1
(e)(i)	Light-dependent resistor or LDR	1
(ii)	Resistor R_2 is replaced by a light-dependent resistor.	1
	Total marks	**12**

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

<table>
<tr><th>Question No.</th><th>Answer</th><th>Mark</th></tr>
<tr><td>9 (a)</td><td>Specific latent heat of fusion is the quantity of energy that is required to change 1 kg of a substance from solid state to liquid state at its melting point..</td><td>1</td></tr>
<tr><td>(b)</td><td>1 - Diagram 9.1 shows a situation where a solid changes into liquid / Diagram 9.2 shows a situation where a liquid changes into gas
2 - Both processes have a change in the state of matter.
3 - Both processes require heat.
4 - The heat absorbed is not to raise the temperature but to overcome the force between the molecule particles during the physical change from one state to another.
5 - Concept involved is Latent Heat</td><td>1
1
1
1
1</td></tr>
<tr><td>(c)(i)

(ii)</td><td>• The sweat absorbs heat
• Water evaporates from the skin when we sweat
• For water to evaporate, heat is released from the body
(Any two correct answers from the above will do.)

• Steam condenses to form water
• In condensation, a large amount of heat is given out to the skin</td><td>)
) Any 2

1
1</td></tr>
<tr><td>(d)</td><td><table><tr><th>Suggestion</th><th>Explanation</th></tr><tr><td>Use insulator behind the absorber panel</td><td>To prevent the loss of heat energy</td></tr><tr><td>Use an absorber panel which is painted black.</td><td>A black surface is a good absorber of radiation so it will absorb heat faster</td></tr><tr><td>The pipe inside the plate must be made of metal</td><td>Metal is a good heat conductor, so it will transmit heat to water easily</td></tr><tr><td>Pipe embedded in plate must be long and winding</td><td>Longer pipe will enlarge surface area will absorb heat faster</td></tr><tr><td>A storage tank must be placed at a higher level</td><td>To give higher pressure</td></tr><tr><td>Use glass cover on the top of the panel</td><td>To trap heat energy.
(energy is radiated in)</td></tr></table>Any five suggestions and 5 corresponding reasons will do.</td><td>2
2
2
2
2</td></tr>
<tr><td></td><td>Total marks</td><td>20</td></tr>
</table>

Question No.	Answer	Mark
10.(a)(i)	**1** The rate of charge flow.	**1**
(b)	**1** Diagram 10.1 is connected in series and Diagram 10.2 is connected in parallel. **2** The reading of ammeter in Diagram 10.2 is greater than in Diagram 10.1. **3** The reading of voltmeter is the same in Diagram 10.1 and Diagram 10.2. **4** The effective resistance in Diagram 10.2 < Diagram 10.1. **5** Effective resistance increases, the current flows decreases. **6** Circuit connected in parallel, the effective resistance decreases.	**6**
(c)	**1** The ammeter reading increases. **2** The voltmeter reading remains the same. **3** Effective resistance in the circuit decreases.	**3**
(d)	**1** Attach one fuse to the live wire in the consumer unit/ fuse box. **2** To break/switch off the circuit when large current before the wire become hotter and produce fire.	**2**
	3 Using the insulating wires // thicker wires **4** To prevent short circuit // To reduce resistance, improve efficiency.	**2**
	5 Attach switch for each lamp. **6** To allows each lamp to be switched on and off independently.	**2**
	7 Connect the metal-fitting lamp to the earth wire/cable. **8** so that (extra) electrons flow to earth to avoid lethal shock.	**2**
	9 Use only 240 V light bulbs. **10** To ensure the bulbs light up with normal brightness.	**2**
	Total marks	**20**

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

11(a)(i) Pascal's Principle states that in an enclosed fluid, an externally applied pressure is transmitted uniformly in all directions. — 1

(ii)

Characteristics	Explanation
Type of liquid: -oil	incompressible
Thickness of brake line: -high	To counter the high pressure from the liquid
The ratio of cross sectional area for wheel piston and master piston: -high	To produce larger force on wheel piston
The choice of the type of brake for front and rear wheel.: Front wheel : disc Rear wheel : drum	Disc brake is more efficient than drum brake

Chosen brake system: S
Reason: it uses oil as the brake liquid, has high thickness of the brake line, the ratio of cross sectional area for wheel and master piston is high, uses disc brake for front wheel and drum brake — 10

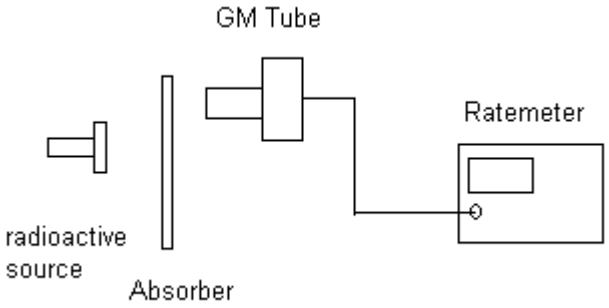
(b) (i)
- when the small piston, X, is pressed down, the pressure is exerted by the piston, X, on the liquid.
- the liquid transmits pressure to all directions and to the large piston, Y.
- when the pressure acts on the larger piston, Y, it produces a larger force.
- the larger force pushes the load up — 4

(ii) $P_x = F_x / A_x = 15 \text{ N} / 0.02 \text{ m}^2$
$= 750 \text{ N m}^{-2}$ — 1

(iii) $F = PA = (750)(0.28)$
$= 210 \text{ N}$ — 2

(iv) Volume of liquid transferred is unchanged
$A_2 x_2 = A_1 x_1$
$x_2 = (A_1 / A_2)(x_1)$
$= (0.02 / 0.28) (21)$
$= 1.5 \text{ cm}$ — 2

Total marks **20**

12.(a)(i)	Half-life is the time required for the activity of a sample of the radioisotope to become halved.	1
(ii)	• emits β – particles, • can penetrate the soil and emerge from the ground	2
	• sufficiently long half-life • after a period of 2 days the activity of the source will be weak enough not to pose any danger	2
	• A Geiger-Muller • Very sensitive detector/ it can be carried about from place to place	2
	• A ratemeter • It gives the count rate directly	2
	• R is suitable • Emits β – particles, have sufficiently long half-life	2
(b) (i)	• Arrangement of apparatus:  • Observe the reading on the scaler without an absorber • Put a piece of paper, aluminium and lead between the source and the detector in turn. • For each kind of absorber, record the reading on the ratemeter. • Carry out the same procedure for the three substances. • α radiation will be stopped by all three kinds of absorber • β radiation will be stopped by aluminium and lead • γ will be stopped by lead only	1 1 1 1 1 1 1
(c)	• wear a photographic badge to measure the intensity of radiation in the surroundings • store radioactive substances in a lead container • use a pair of forceps or tweezers to hold a radioactive substance.	2 (any two)
	Total marks	**20**

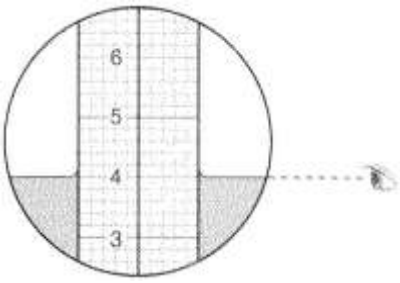
END OF MARKING SCHEME

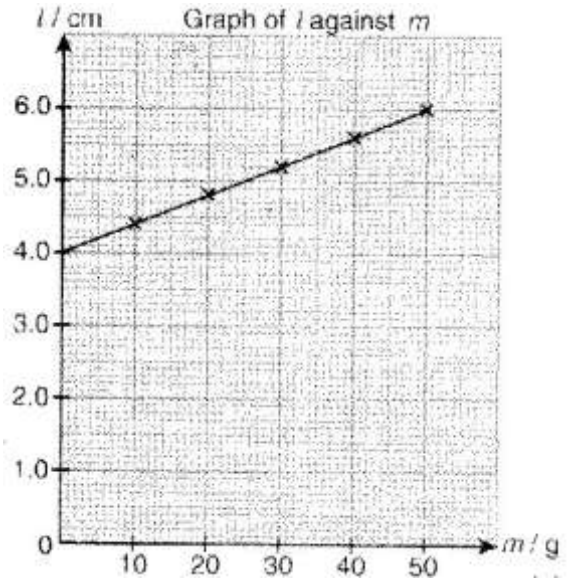
Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

SPM Trial Examination 2008
Bahagian Gabungan Kuching
Physics
Paper 3
Marking Scheme

Section A

Question 1

<table>
<tr><td>1 (a) i</td><td>Mass of sand, m</td><td>1</td></tr>
<tr><td>ii</td><td>Length of the cylinder submerged in the liquid, l</td><td>1</td></tr>
<tr><td>iii</td><td>Type of liquid // density of liquid</td><td>1</td></tr>
<tr><td>(b) i.</td><td> 
</td><td>1</td></tr>
<tr><td>ii.</td><td><table>
<tr><th>m/g</th><th>l/cm</th></tr>
<tr><td>10</td><td>4.4</td></tr>
<tr><td>20</td><td>4.8</td></tr>
<tr><td>30</td><td>5.2</td></tr>
<tr><td>40</td><td>5.6</td></tr>
<tr><td>50</td><td>6.0</td></tr>
</table></td><td>5</td></tr>
</table>

(c)		5
(d)	*l* increases linearly with *m*	1
(e)	Use a cylinder of smaller diameter so that the change *l* is big enough to be observed	1
	Total marks	16

2 (a) i	*x* is inversely proportional to *a* // $\frac{1}{x}$ is directly proportional to *a*	1
ii	Show on the graph When *a* = 3 cm, $\frac{1}{x} = 1.5\ \text{cm}^{-1}$ *x* = 0.67 cm	1 1 1
iii	Show on the graph with right-angle triangle or two points shown and the height of right-angle triangle must ≥ 8 cm Gradient = $\frac{(2.5-0)cm^{-1}}{(5-0)cm}$ = 0.5 cm^{-2}	1 1 1

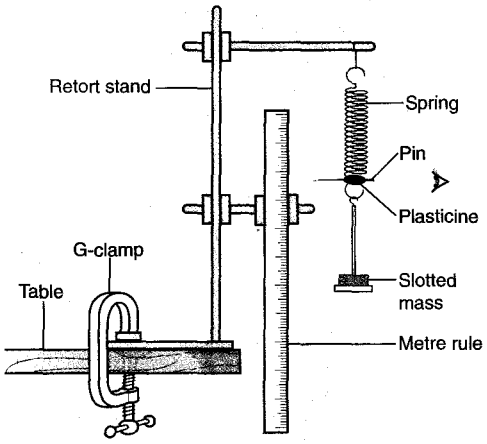
(b)	Gradient $= \frac{\left(\frac{1}{x}\right)}{a} = \frac{1}{ax}$ $\lambda = \frac{ax}{D} = \frac{\left(\frac{1}{0.5}\right)cm^2}{30cm}$ $\lambda = 0.0667$ cm	1 1 1
(c)	i. increase the distance, *D*, between the sources and the position of fringe separation is marked, **or** ii. decrease the distance between two coherent sources, *a*, **or** iii. use longer wavelength by decreasing the frequency of the vibrator	1
(d)	The depth of water is uniform // Repeat readings and take average	1
	Total marks	12

Section B

Question 3

(a) Inference	The extension of a spring depends on the applied force.	1
(b) Hypothesis	The extension of a spring is directly proportional to the applied force.	1
(c)(i)Aim	To investigate the relationship between force and extension of a spring.	1
(ii) Manipulated variable	Force, *F*	1
Responding variable	Extension of the spring, *x*	
Fixed variable	Type of spring//Elasticity//Stiffness of the spring	1
(iii) List of apparatus and materials.	Metre rule, retort stand with two clamps, G-clamp, steel spring, slotted masses, holder of slotted masses, pin, plasticine.	1

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

<table>
<tr>
<td>(iv) Arrangement of the apparatus</td>
<td> 
</td>
<td>1</td>
</tr>
<tr>
<td>(v) Procedure</td>
<td>1. Mark the initial position of the pin on the metre rule when no weight is attached to the spring.

2. Attach a slotted weight of 40 g to the end of the spring and compare the new position. Measure the extension of the spring and record as x.

3. The experiment is repeated with different values of the slotted weight 60 g, 80 g, 100 g, and 120 g.</td>
<td>1

1

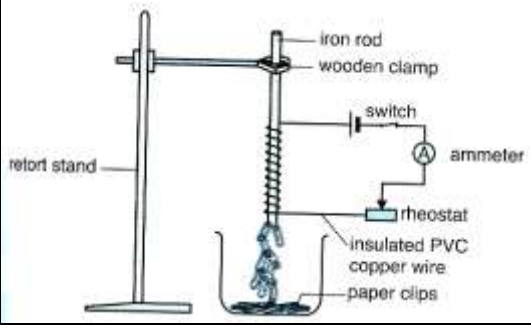
1</td>
</tr>
<tr>
<td>(vi)
Tabulation of results</td>
<td>
<table>
<tr><td>Mass of slotted weight, m/g</td><td>40</td><td>60</td><td>80</td><td>100</td><td>120</td></tr>
<tr><td>Weight of slotted weight, F/N</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Extension, x/cm</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td>
<td>1</td>
</tr>
<tr>
<td>(vii)
Analysis of results</td>
<td>A graph of Extension, x against weight, F is drawn.

or</td>
<td>1</td>
</tr>
</table>

Sarawak Zon A Trial SPM 2008
http://edu.joshuatly.com/
http://www.joshuatly.com/

		
	Total marks	12

Question 4

(a) Inference	The strength of the electromagnetic field depends on the magnitude of the current.	1
(b) Hypothesis	As the current increases, the strength of the electromagnetic field also increases.	1
(c)(i) Aim	To investigate the relationship between the current and the strength of the electromagnetic field.	1
(ii) Manipulated variable	Current	1
Responding variable	Number of pins attracted to the electromagnet (the strength of the electromagnetic field)	
Fixed variable	Number of turns in solenoid	1
(iii) List of apparatus and materials.	Ammeter, rheostat, power supply, soft iron core, insulated cooper wire, iron pins, and connecting wires.	1
(iv) Arrangement of the apparatus		1

<table>
<tr>
<td>(v) Procedure</td>
<td>1. The apparatus is set up as shown.

2. The rheostat is adjusted to get current, I = 0.5 A.

3. The number of pins that stick to the iron core or electromagnet is counted and recorded.

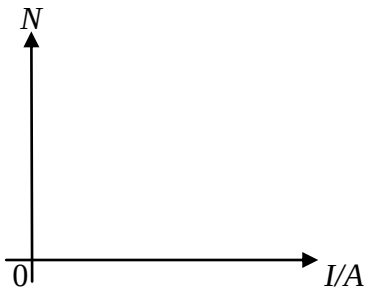
4. The experiment is repeated by adjusting the rheostat for current of 1.0 A, 1.5 A, 2.0 A, and 2.5 A.

5. The data is recorded in the table and a graph is drawn.</td>
<td>1

1

1</td>
</tr>
<tr>
<td>(vi) Tabulation of results</td>
<td>
<table>
<tr><th>Current, I/A</th><th>No. of pins that stick to the electromagnet, N</th></tr>
<tr><td>0.5</td><td></td></tr>
<tr><td>1.0</td><td></td></tr>
<tr><td>1.5</td><td></td></tr>
<tr><td>2.0</td><td></td></tr>
<tr><td>2.5</td><td></td></tr>
</table>
</td>
<td>1</td>
</tr>
<tr>
<td>(vii) Analysis of results</td>
<td>A graph of N against I is drawn.

Or

 
</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total marks</td>
<td>12</td>
</tr>
</table>