

FORM 5 PHYSICS CHAPTER 1 : WAVES

QUESTION 1 - 2014 TERENGGANU

Diagram 1 shows scale of an ammeter.

Rajah 1 menunjukkan skala sebuah ammeter.

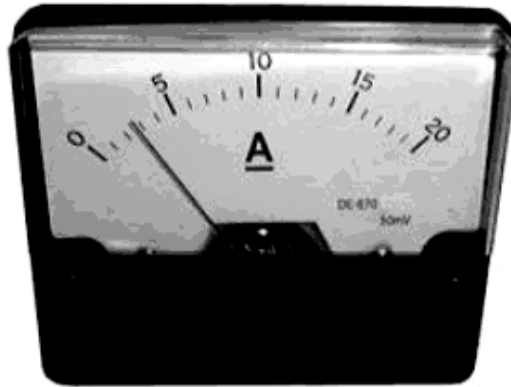


Diagram 1
Rajah 1

- (a) What is the physical quantity measured by the ammeter?
Apakah kuantiti fizik yang diukur oleh ammeter tersebut?

[1 mark]

- (b) State the value of the smallest division on the scale.
Nyatakan nilai senggatan terkecil pada skala tersebut.

[1 mark]

- (c) Complete the following sentence by ticking (✓) the correct box.
Lengkapkan ayat berikut dengan menandakan (✓) dalam kotak yang betul.

In an electric circuit the ammeter is connected.

Dalam suatu litar elektrik ammeter itu disambungkan secara

Series
Sesiri

Parallel
Selari

[1 mark]

- (d) What is the reading shows by the ammeter.
Berapakah bacaan yang ditunjukkan oleh ammeter itu.

[1 mark]

Suggested answer

(a)	Current
(b)	1A // 1
(c)	Series
(d)	3 A

QUESTION 2 - 2014 KELANTAN SET 3

Diagram 1 shows a boy is shouting in front of a building . After 1 second, an echo is heard.

Rajah 1 menunjukkan seorang budak berteriak di hadapan sebuah bangunan. selepas satu saat. satu gema kedengaran.



Diagram 1
Rajah 1

(a) Complete the sentence below by ticking (✓) the correct box.

Lengkapkan pernyataan di bawah dengan (✓) pada kotak yang betul

Sound wave is a

Gelombang bunyi adalah

transverse wave
gelombang melintang

longitudinal wave
gelombang membujur

[1 mark]

(b) State the wave phenomenon that occurred.

Nyatakan fenomena yang terlibat.

[1 mark]

(c) State the change in the velocity and frequency of the sound wave after it hit the building.

Nyatakan perubahan dalam halaju dan frekuensi gelombang bunyi selepas menghentam bangunan

(i) Velocity

Halaju

- (ii) Frequency
frekuensi

[2 mark]

Suggested answer

(a)	longitudinal wave
(b)	reflection
(c)(i)	change the direction
(ii)	unchanged

QUESTION 3 – 2015 PERAK MOCK TEST 2

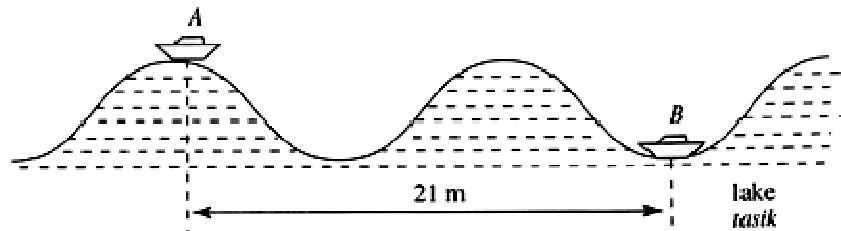
Two boats A and B are anchored at a distance of 21 m from each other on the surface of a lake. Water waves produced by the wind cause boat A to be at the crest and boat B to be at the trough of the same water wave, as shown in Diagram 1.

Each boat vibrates up and down 25 times in 10 seconds.

Dua buah bot A dan B berada di permukaan sebuah tasik pada jarak pemisahan 21 m.

Gelombang air yang dihasilkan oleh angin menyebabkan bot A berada pada kedudukan puncak manakala bot B berada pada kedudukan lembangan, seperti ditunjukkan dalam Rajah 1.

Dalam masa 10 saat, setiap bot bergetar turun-naik sebanyak 25 kali.



- (a) Calculate

Hitungkan

- (i) the wave length of the water waves.

panjang gelombang bagi gelombang air itu.

[1 mark]

- (ii) the frequency of the water waves.

frekuensi gelombang air itu.

[1 mark]

- (b) State one factor which can affect the speed of the water waves on the lake surface.

Nyatakan satu faktor yang boleh mempengaruhi laju gelombang air di permukaan tasik itu.

[1 mark]

- (c) If the vertical height of boat A from the level of boat B is 1.0 m, what is the amplitude of the water waves?

Jika tinggi tegak bot A dari aras bot B ialah 1.0 m, berapakah amplitude gelombang air itu?

[1 mark]

Suggested answer

(a)(i)	Distance /jarak AB = $3/2 \lambda$ $3/2 \lambda = 21 \text{ m}$ $\lambda = 14 \text{ m}$
(ii)	Frequency/ frekuensi , $f = \frac{25}{10}$ $= 2.5 \text{ Hz}$
(b)	Speed of wind // depth of water <i>Kelajuan angin // kedalaman air</i>
(c)	Vertical distance A to B = 2 amplitude = 1.0 m <i>Jarak tegak A ke B = 2 amplitud = 1.0 m</i> Amplitude / amplitud = 0.5 m

QUESTION 4 - 2014 PAHANG SET A

Diagram 3.1 shows waves moving towards a harbour.

Rajah 3.1 menunjukkan ombak sedang bergerak menuju ke sebuah pelabuhan.

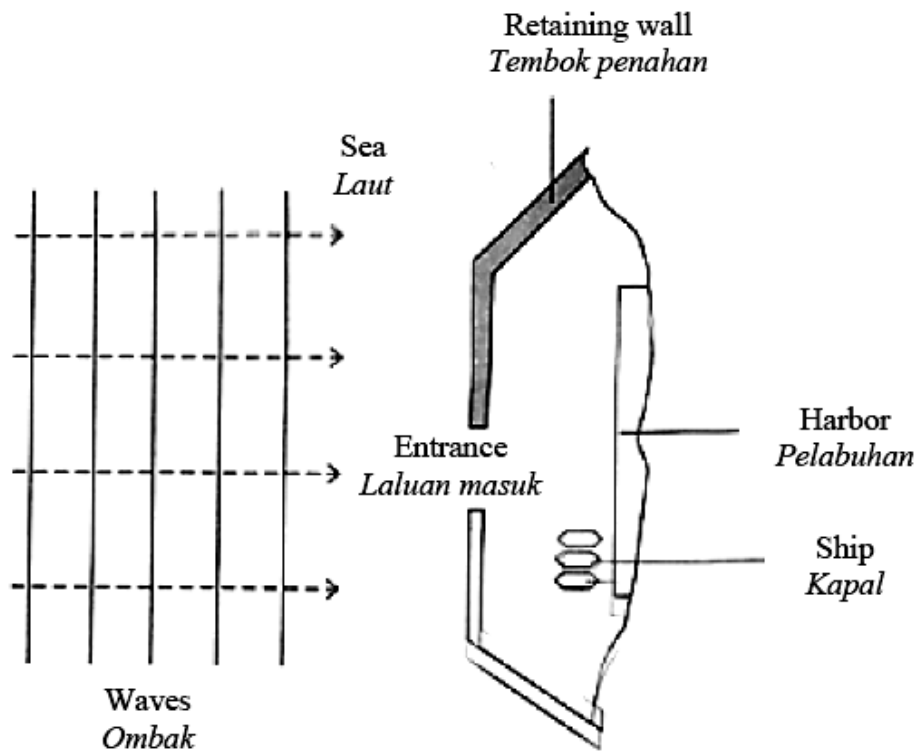


Diagram 3.1/Rajah 3.1

(a) What type of wave is the water wave?

Apakah jenis gelombang bagi gelombang air?

[1 mark]

(b) Based on Diagram 3.1.

Berdasarkan Rajah 3.1,

- (i) Name the wave phenomenon after passing through the entrance of the harbor.
Namakan fenomena gelombang selepas melalui laluan masuk pelabuhan itu.

[1 mark]

(ii) Draw the wave pattern of the waves after passing through the entrance of the harbor on Diagram 3.2

Lukis corak gelombang bagi ombak itu selepas melalui laluan masuk pelabuhan itu pada Rajah 3.2

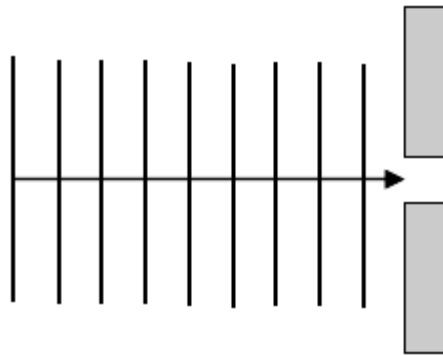


Diagram 3.2

Rajah 3.2

[2 mark]

(c) The entrance is made wider to allow more ships to enter the harbor.

Laluan masuk itu dijadikan lebih lebar untuk membenarkan lebih banyak kapal memasuki pelabuhan.

What is the effect on :

Apakah kesan terhadap :

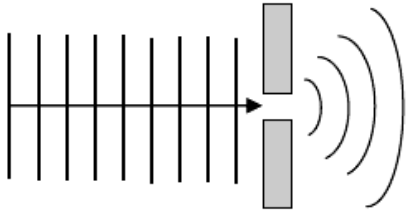
- (i) the waves passing through the entrance ?
gelombang yang melalui laluan masuk itu?

[1 mark]

- (ii) the harbour ?
pelabuhan itu ?

[1 mark]

Suggested answer

(a)	Transverse wave
(b)(i)	Diffraction
(ii)	
(c)(i)	Less diffraction / less spreading / wave energy increase
(ii)	More damage to the harbour / soil erosion

QUESTION 5 - 2014 KEDAH MODUL (1)

Diagram 6.1 shows a water waves passing through a log of wood floating on water.

Diagram 6.2 shows a student standing at one corner of a building at B hearing the sound from a loudspeaker at A.

Rajah 6.1 menunjukkan gelombang air bergerak melalui sebatang kayu balak yang terapung di atas permukaan air.

Rajah 6.2 menunjukkan seorang pelajar berdiri di satu sudut bangunan pada kedudukan B dan mendengar bunyi daripada pembesar suara di kedudukan A.

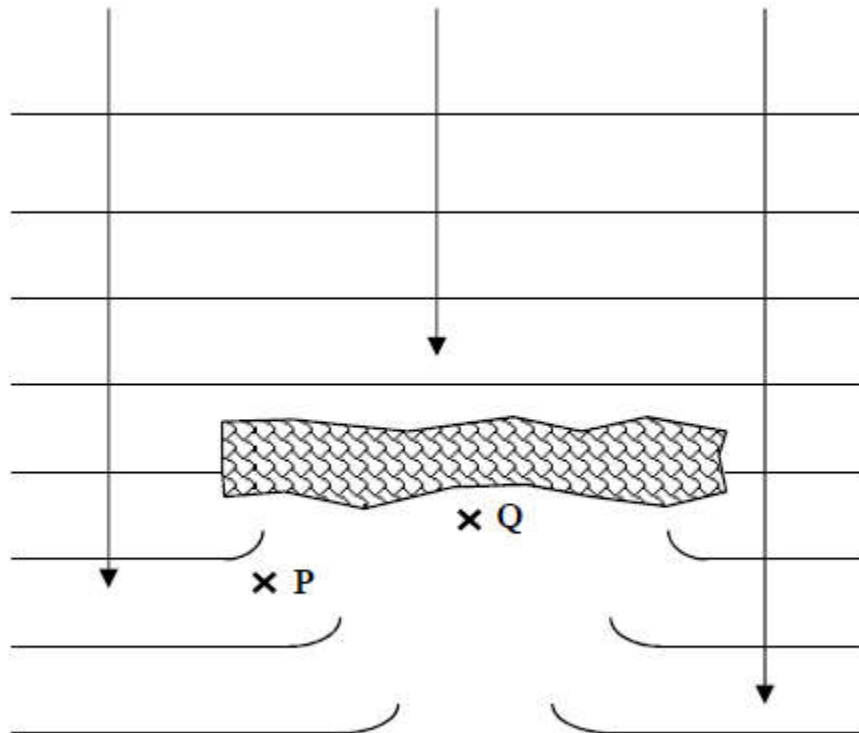


Diagram 6.1 / Rajah 6.1

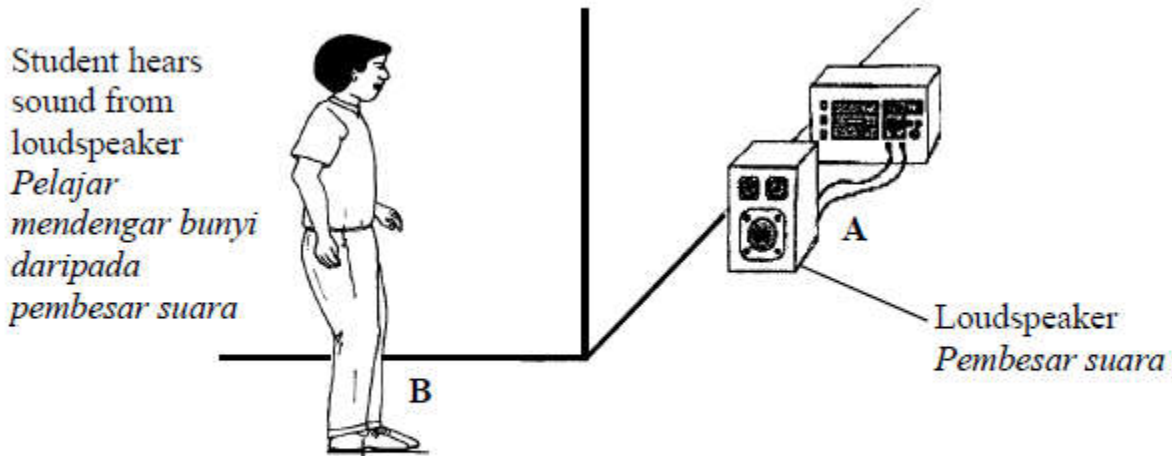


Diagram 6.2 / Rajah 6.2

(a) Based on Diagram 6.1 and Diagram 6.2:

Berdasarkan Rajah 6.1 dan Rajah 6.2:

- (i) What happens to the wave after passing round the log and the corner of the building?
Apakah yang terjadi kepada gelombang selepas melepasi kayu balak dan sudut bangunan itu?

[1 mark]

- (ii) What happens to the amplitude of the waves after passing round the log and the corner of the building? Explain your answer.
Apakah yang terjadi kepada amplitud gelombang itu selepas melepasi kayu balak dan sudut bangunan itu? Terangkan jawapan anda.

[2 mark]

- (iii) Name the wave phenomenon that is related to Diagram 6.1 and Diagram 6.2.
Namakan fenomena gelombang yang berhubungkait dengan Rajah 6.1 dan Rajah 6.2.

[1 mark]

- (iv) What will happen to the speed of the water waves after passing through the log?
Apakah akan terjadi kepada laju gelombang air selepas melalui kayu balak itu?

[1 mark]

(b) Referring to Diagram 6.1. what will happen to a floating object that is placed at
Merujuk kepada Rajah 6.1, apakah akan terjadi kepada satu objek terapung yang diletakkan pada

(i) P ?

_____ [1 mark]

(ii) Q ?

_____ [1 mark]

(c) Name one other wave phenomenon that occurs in Diagram 6.1.

Namakan satu fenomena gelombang lain yang berlaku pada Rajah 6.1.

_____ [1 mark]

Suggested answer

(a)(i)	spreads out // spreading
(ii)	Amplitude of the waves decrease Energy of the wave has spread out to cover a bigger area
(iii)	Diffraction
(iv)	No change
(b)(i)	Vibrates
(ii)	Remains stationary
(iii)	Reflection

QUESTION 6 - 2014 PAHANG SET A

Diagram 6.1 and Diagram 6.2 show images are formed in a ripple tank when two water waves are produced by two coherent sources.

Rajah 6.1 dan Rajah 6.2 menunjukkan imej yang terbentuk dalam tangki riak apabila dua gelombang air dihasilkan oleh dua punca yang koheren.

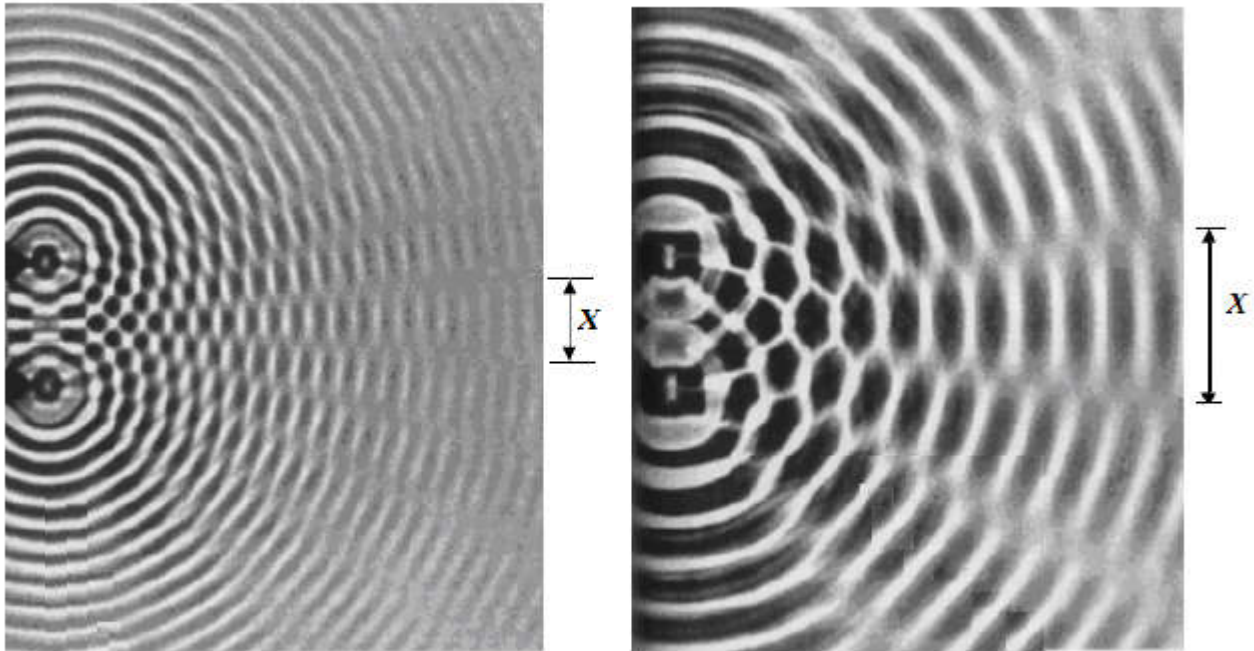


Diagram 6.1/Rajah 6.1

Diagram 6.2/Rajah 6.2

- (a) What is meant by two coherent sources of wave?

Apakah yang dimaksudkan dengan dua sumber gelombang yang koheren ?

[1 mark]

- (b) Observe Diagram 6.1 and Diagram 6.2. compare
Perhatikan Rajah 6.1 dan Rajah 6.2, bandingkan

- (i) The wavelength, λ of the water wave.
Panjang gelombang, λ bagi gelombang air.

[1 mark]

- (ii) The distances between two consecutive nodal lines, x .
Jarak antara dua garis nodal berturutan, x .

[1 mark]

- (iii) Relate the wavelength, λ , to the distance between two consecutive nodal lines, x .
Hubungkan panjang gelombang, λ , dengan jarak antara dua garisan nodal berturutan, x .

[1 mark]

- (c) Name the wave phenomenon involved.
Namakan fenomena gelombang terlibat.

[1 mark]

- (d) (i) Explain how the nodes lines and antinodes lines occur.
Terangkan bagaimana garis nodal dan garis antinodal terhasil.

[1 mark]

- (ii) Name the physics' principle used to explain your answer in 6 (d)(i).
Namakan prinsip fizik yang digunakan untuk menerangkan jawapan anda di 6 (d)(i).

[1 mark]

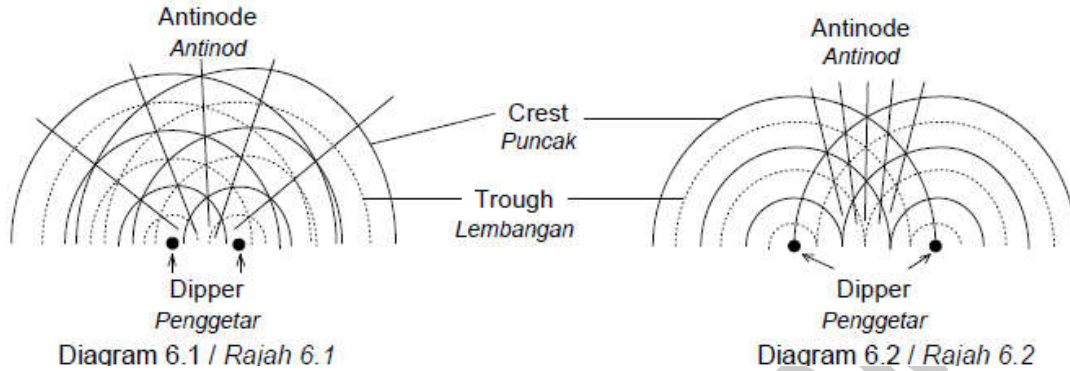
Suggested answer

(a)	The wave sources that produced waves with same frequency and same phase. <i>Sumber-sumber gelombang yang menghasilkan gelombang dengan frekuensi yang sama dan fasa yang sama.</i>
(b)(i)	Wavelength of water wave in Diagram 6.1 < wavelength of water wave in Diagram 6.2 <i>Panjang gelombang bagi gelombang air dalam Rajah 6.1 < panjang gelombang bagi gelombang air dalam Rajah 6.2</i>
(b)(ii)	The distance between two consecutive nodal lines, x in Diagram 6.1 < the distance between two consecutive nodal lines, x in Diagram 6.2. <i>Jarak antara dua garis nodal, x dalam Rajah 6.1 < jarak antara dua garis nodal, x dalam Rajah 6.2</i>
(b)(iii)	The higher the wavelength of water wave, λ , the higher the distance between two consecutive nodal lines, x . <i>Semakin tinggi panjang gelombang, λ bagi gelombang air, semakin tinggi jarak antara dua garis nodal, x berturutan.</i>
(c)	Interference of wave <i>Interferens gelombang</i>
(d)(i)	Nodes lines produced when destructive interference occur <i>Garis nodal terhasil apabila interferens memusnah berlaku</i> Antinodes lines produces when constructive interference occur. <i>Garis antinodal terhasil apabila interferens membina berlaku</i>
(d)(ii)	Principle of Superposition <i>Prinsip superposisi</i>

QUESTION 7 - 2014 SARAWAK

Diagram 6.1 and Diagram 6.2 show the wave patterns in a ripple tank by the vibrations of two spherical dippers.

Rajah 6.1 dan Rajah 6.2 menunjukkan corak-corak gelombang di dalam satu tangki rak oleh getaran dua penggetar sfera



- (a) What is the wave phenomenon shown in Diagram 6.1 and Diagram 6.2?
Apakan fenomena gelombang yang ditunjukkan dalam Rajah 6.1 dan Rajah 6.2?

[1 mark]

- (b) Observe Diagram 6.1 and Diagram 6.2, compare:
Perhatikan Rajah 6.1 dan Rajah 6.2, bandingkan:

- (i) Compare the distance between two dippers.
Bandingkan jarak antara dua penggetar.

[1 mark]

- (ii) Compare the distance between two consecutive antinodal lines
Bandingkan jarak antara dua garis antinod yang berturutan.

[1 mark]

- (c) Relate the distance between two dippers with the distance between two consecutive antinodal lines
Hitungkait jarak antara dua penggetar dengan jarak antara dua garis antinod yang berturutan.

[1 mark]

- (d) (i) Explain how the nodes lines and antinodes lines occur.
Terangkan bagaimana garis nodal dan garis antinodal terhasil.

[2 marks]

(ii) Name the physics' principle used to explain your answer in 6(d)(i)

Namakan prinsip fizik yang digunakan untuk menerangkan jawapan anda di 6(d)(i).

[1 mark]

(e) What will happen to the distance between two consecutive antinodal lines if the depth of water used in Diagram 6.1 increases?

Apakah yang akan berlaku kepada jarak antara dua garis antinod yang berturutan jika kedalaman air dalam Rajah 6.1 bertambah?

[1 mark]

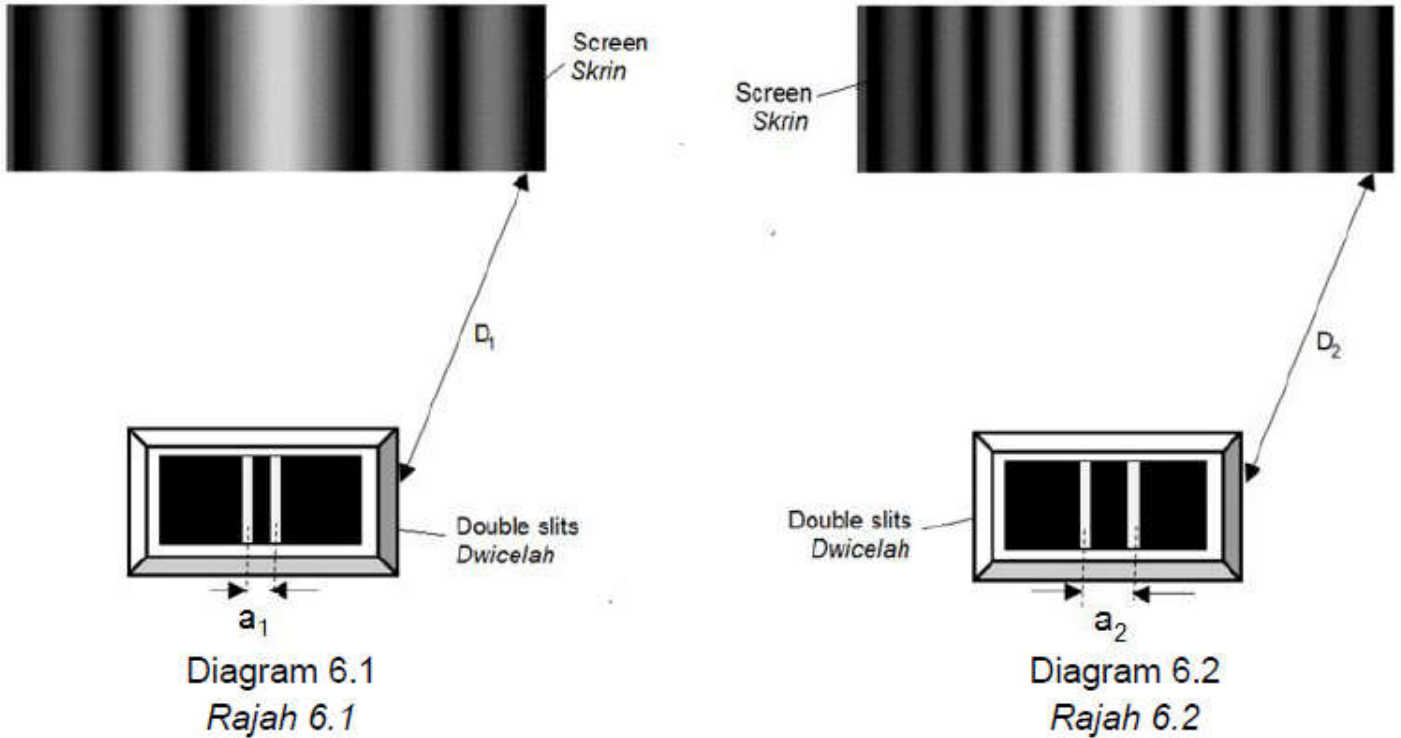
Suggested answer

(a)	Interference
(b)(i)	Distance between two dippers in Diagram 6.1 is nearer than in Diagram 6.2
(b)(ii)	Distance between two consecutive antinodal lines in Diagram 6.1 is more than in Diagram 6.2
(c)	Smaller distance between two dippers, higher the distance between two consecutive antinodal lines
(d)(i)	Nodal line - destruction between the crest with trough Antinodal line - construction between the crest with crest or trough with trough
(d)(ii)	Principle of superposition
(e)	Increases

QUESTION 8 - 2014 KELANTAN SET 1

Diagram 6.1 and Diagram 6.2 show the fringes' patterns produced when two identical monochromatic lights passing through two double slits of different width.

Rajah 6.1 dan Rajah 6.2 menunjukkan corak pinggir yang dihasilkan apabila dua cahaya monokromatik yang sama melalui dua dwicelah dengan lebar yang berbeza.



- (a) What is the meaning of monochromatic light?
Apakah yang dimaksudkan dengan cahaya monokromatik?

[1 mark]

- (b) Explain how fringes are formed on the screen?
Terangkan bagaimana pinggir-pinggir terbentuk di atas skrin?

[2 marks]

- (c) Using Diagram 6.1 and Diagram 6.2. compare:
Menggunakan Rajah 6.1 dan 6.2. bandingkan:

- (i) The distance between the two slits, a .
Jarak di antara dua celah, a .

[1 mark]

(ii) The wavelength, λ of the monochromatic light.
Panjang gelombang. λ bagi cahaya monokromatik itu.
 _____ [1 mark]

(iii) The distance between the double slits and the screen, D .
Jarak di antara dwicelah dan skrin, D .
 _____ [1 mark]

(iv) The distance between the fringes, x produced on the screen.
Jarak di antara pinggir-pinggir, x yang terhasil di atas skrin.
 _____ [1 mark]

(d) Using your answers in 6 (c) state the relationship between x and a .
Menggunakan jawapan anda di 6(c) nyatakan hubungan antara x dan a
 _____ [1 mark]

Suggested answer

(a)	Light that has one colour / wavelength / frequency
(b)	M1 Overlapping between crest and crest/trough and trough producing a constructive interference / bright fringes M2 Overlapping between crest and trough producing a destructive interference / dark fringes
(c)(i)	Diagram 6.1 < Diagram 6.2 / vice-versa // $a_1 < a_2$ / vice-versa
(ii)	Same / equal
(iii)	Same / equal / $D_1 = D_2$
(iv)	Diagram 6.1 > Diagram 6.2 / vice-versa
(d)	$x \propto \frac{1}{a}$

QUESTION 9 - 2014 PAHANG

Table 8 shows two types of ship use to locate underwater object and their characteristics.

Jadual 8 menunjukkan dua buah kapal digunakan untuk mengesan objek di bawah laut dan ciri-cirinya.

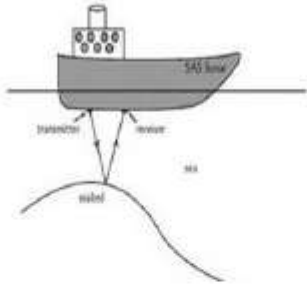
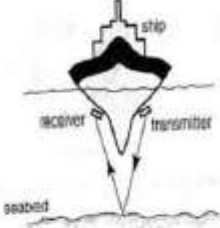
Type of ship Jenis kapal	With CRO Dengan OSK	Without CRO Tanpa OSK
		
Model	X	Y
Type of wave Jenis gelombang	Ultrasound	Sound wave
Frequency Frekuensi	5.0×10^4 Hz	1.5×10^2 Hz

Table 8

- (a) What is the meaning of transverse wave?
Apakah maksud gelombang melintang?

[1 mark]

- (b) Based on Table 8, state suitable characteristics of ship to locate underwater object accurately
Berdasarkan Jadual 8, nyatakan ciri-ciri yang sesuai bagi kapal untuk mengesan objek dengan tepat.

Give the reason for the suitability of the characteristics.
Berikan sebab untuk kesesuaian ciri-ciri itu.

- (i) Type of wave
Jenis gelombang

Reason
Sebab

[2 marks]

(ii) Frequency
Frekuensi

Reason
Sebab

[2 marks]

(iii) Cathod Ray Oscilloscope
Osiloskop Sinar Katod

Reason
Sebab

[2 marks]

- (c) The depth of the wreckage ship is 1000m into the sea. A ship transmits a waves of frequency 50 kHz and receives an echo 2.4s later.
Kedalaman bangkai kapal ialah 1000m ke dalam laut. Sebuah kapal memancarkan gelombang berfrekuensi 50kHz dan menerima gema 2.4s kemudian.

Calculate

Hitung

- (i) The speed of the wave in the water.
Laju gelombang dalam air.

[2marks]

- (ii) The wavelength of the wave in the water
Panjang gelombang bagi gelombang tersebut.

- (d) Determine the most suitable ship that can detech underwater object accurately
Tentukan kapal yang paling sesuai untuk mengesan objek di bawah laut dengan tepat.

[1 mark]

Suggested answer

(a)	Gelombang di mana arah getaran mediumnya adalah berserenjang dengan arah perambatan gelombang.
(b)(i)	Ultrasound Tenaga tinggi
(b)(ii)	Frekuensi tinggi Tenaga tinggi
(b)(iii)	Ada Osiloskop Sinar Katod Untuk mengesan kedalaman
(c)(i)	Halaju gelombang air = $\frac{2 \times 1000\text{m}}{(2.4)}$ $= 833.33\text{ms}^{-1}$
(c)(ii)	Panjang gelombang = $\frac{833.33\text{ms}}{50\,000\text{ Hz}}$ $= 0.0167 = 0.017\text{ m}$
(d)	Model X

QUESTION 10 - 2014 KELANTAN SET 2

Diagram 8.1 shows a when tuning fork is hit it will produce sound waves.

Rajah 8.1 menunjukkan apabila sebuah tala bunyi diketuk ia akan menghasilkan gelombang bunyi.

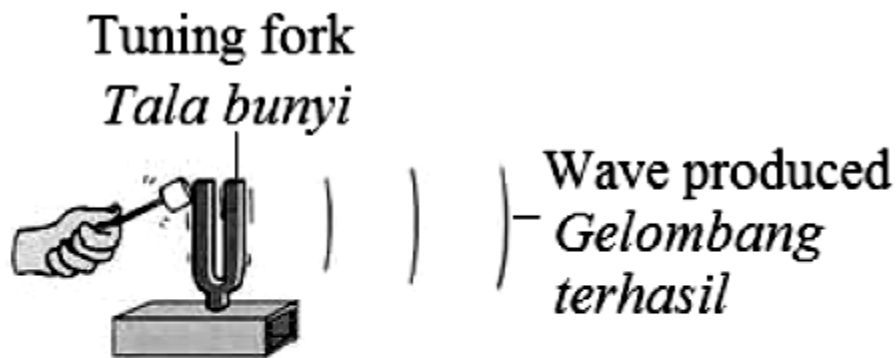


Diagram 8.1

Rajah 8.1

(a) State the type of wave produced by the tuning fork.

Nyatakan jenis gelombang yang dihasilkan oleh tala bunyi.

[1 mark]

- (b) Diagram 8.2 shows when another tuning fork is brought near to the vibrating tuning fork, the second tuning fork it will also vibrate.

Rajah 8.2 menunjukkan apabila satu lagi tala bunyi di bawa mendekati tala bunyi yang bergetar itu tala bunyi yang kedua ini akan juga bergetar.



Diagram 8.2

Rajah 8.2

- (i) Name the incident happen.

Namakan kejadian yang berlaku.

[1 mark]

- (ii) State on condition for the above incident to happen.

Nyatakan satu syarat untuk berlakunya kejadian diatas.

[1 mark]

(c) Diagram 8.3 shows a sound wave form produced by a tuning fork displayed on the screen of cathode ray oscilloscope.

Rajah 8.3 menunjukkan suatu bentuk gelombang bunyi yang dihasilkan oleh suatu tala bunyi ditunjukkan pada skrin tiub sinar katod.

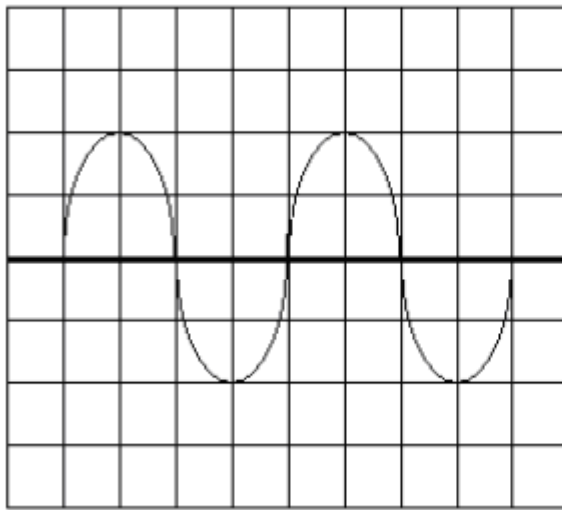


Diagram 8.3

Rajah 8.3

On Diagram 8.4. draw the sound wave form produced when the loudness is increased.

Pada Rajah 8.4. lukiskan bentuk gelombang bunyi yang dihasilkan bila kekuatan ditambah.

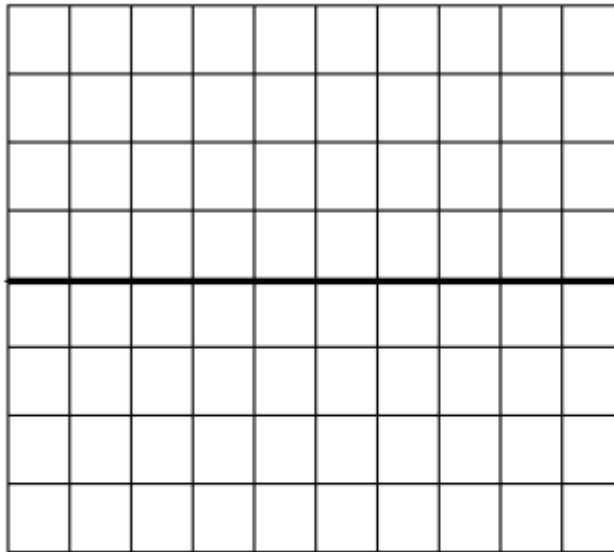


Diagram 8.4

Rajah 8.4

[1 mark]

[1 markah]

(d) Diagram 8.5 shows an electromagnetic wave spectrum.

Rajah 8.5 menunjukkan satu spektrum gelombang elektromagnet

Radio wave	Microwave	P	Visible light	Q	X-ray	Gamma ray
<i>Gelombang radio</i>	<i>Gelombang mikro</i>		<i>Cahaya nampak</i>		<i>Sinar-x</i>	<i>Sinar Gama</i>

Diagram 8.5

Rajah 8.5

- (i) Name the wave for;
Namakan gelombang bagi:
P: _____
Q: _____ [2 marks]
- (ii) Choose one wave that harmful to human body.
satu gelombang yang merbahaya kepada badan manusia.
_____ [1 mark]
- (iii) Give one reason for the answer in 1 (c) (ii).
Beri satu sebab bagi jawapan di 1 (c)(ii).
_____ [1 mark]
- (iv) Choose one wave that used in telecommunications.
Pilih satu gelombang yang sesuai digunakan dalam telekomunikasi.
_____ [1 mark]
- (v) Give one reason for the answer in 1 (c) (iv).
satu sebab bagi jawapan di 1 (c) (iv).
_____ [1 mark]

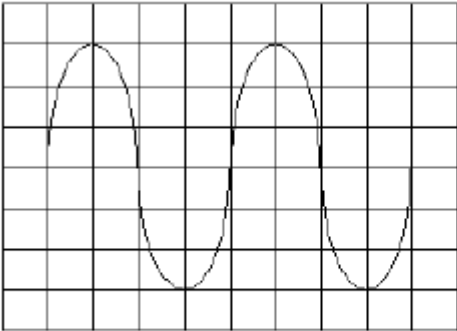
- (vi) Choose the suitable wave that can be used in cancer treatment.
Pilih gelombang yang sesuai digunakan untuk rawatan penyakit kanser.

[1 mark]

- (vii) Give one reason for the answer in 1 (c) (vi).
Beri satu sebab bagi jawapan di 1(c) (vi).

[1 mark]

Suggested answer

(a)(i)	Longitudinal wave / mechanical wave
(b)(i)	Resonance
(ii)	Same frequency // energy transferred
(c)	 <p>(Amplitude of the wave drawn is bigger)</p>
(d)(i)	P - Infrared Q - Ultraviolet
(ii)	Gamma ray / ultraviolet / x-Ray
(iii)	Can kills the life cell / skin burn or skin cancer /
(iv)	Radio wave / microwave
(v)	High frequency / high energy / high penetrating power / less diffracted
(vi)	Gamma Ray
(vi)	high energy / high penetrating power