

4531/2
Fizik
Kertas 2
September
2011
2 ½ jam



MAJLIS PENGETUA SEKOLAH MALAYSIA
CAWANGAN PULAU PINANG

MODUL PENILAIAN
SIJIL PELAJARAN MALAYSIA 2011

FIZIK

Kertas 2

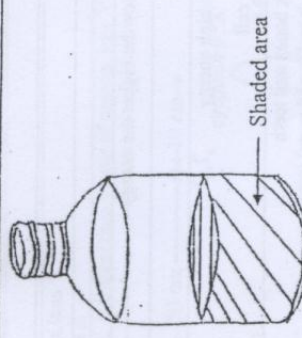
PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA


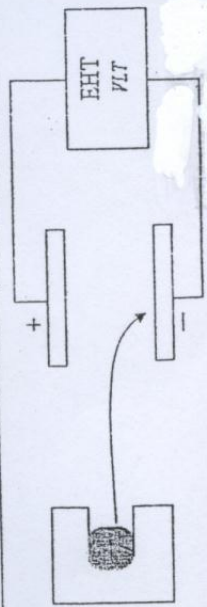
Nota :
Skema pemarkahan ini dalam Bahasa Inggeris sahaja

Skema ini mengandungi 9 halaman bercetak

SECTION A

NO.	ANSWER	MARK	
		SUB	TOTAL
4(a)(i)	Increase the number of turns in the secondary coil.	1	
(a)(ii)	Decrease the number of turns in the primary coil.	1	
(b)	Can be magnetized and demagnetized easily	1	
(c)(i)	$36 = 24 \times I$	1	
	$I = 1.5 A$	1	
(c)(ii)	$36 = (240)I_p$	1	
	$I_p = 0.15A$	1	7
5(a)(i)	Distance of liquid spurt in diagram 5.2 is bigger // Distance of liquid spurt in diagram 5.1 is shorter	1	
(a)(ii)	Density of liquid Y is bigger // Density of liquid X is smaller	1	
(a)(iii)	Pressure of liquid is directly proportional to the distance of liquid spurts	1	
(a)(iv)	Pressure of liquid is directly proportional to the density of the liquid	1	
(b)			
(c)(i)	Pressure caused by a thick layer of air above the earth's surface	1	
(c)(ii)	250 m Water	1	
(c)(iii)	Pressure at X is higher // Pressure at Y is lower	1	8

SECTION A

NO.	ANSWER	MARK	
		SUB	TOTAL
1(a)	vector quantity 	1	
(b)(i)	constant // unchanged	1	
(b)(ii)	zero // 0 ms^{-2}	1	
(c)	Lorry moves 50 m in 1 s // Lorry travels 50 m every 1 second	1	4
2(a)	Object falls under the force of gravity only // Object falls in the acceleration of gravity	1	
(b)	$20 = 0 + \frac{1}{2} (10) t^2$	1	
	2 s	1	
(c)	$V = 0 + 10(2)$	1	5
	20 ms^{-1}	1	
3(a)(i)	Atom of an element which have the same proton number but different nucleon numbers and emit radioactive rays //	1	
(a)(ii)	Unstable isotopes which decay and give out radioactive emissions Alpha // α // Helium nucleus	1	
(b)	$3.35 \times 10^{-27} \times (3.0 \times 10^8)^2$	1	
	$3.02 \times 10^{-10} \text{ J}$	1	
(c)(i)		1	
(c)(ii)	An alpha particle is positively charge	1	6

SECTION A

NO.	ANSWER	MARK	
		SUB	TOTAL
6(a)(i)	Size of slit in diagram 6.1 is smaller // 6.1 < 6.2 //	1	8
6(a)(ii)	Size of slit in diagram 6.2 is bigger // 6.2 > 6.1	1	
6(a)(iii)	Pattern of wave in diagram 6.1 is circular while in diagram 6.2 is bend at the edges.	1	
6(b)	The smaller the size of slit, the wave is spreading out more //	1	
6(c)(i)	The smaller the size of slit, the diffraction pattern is more obvious //	1	
6(c)(ii)	The smaller the size of slit, the wave is diffracted more	1	
6(d)(i)	Diffraction of waves // spreading of waves	1	
6(d)(ii)	Diagram 6.1	1	
6(d)(iii)	Energy of wave is spread out //	1	
6(d)(iv)	Energy of wave is dispersed //	1	
6(d)(v)	Amplitude of wave is reduced	1	
6(d)(vi)	Less diffracted	1	
6(d)(vii)	Frequency is inversely proportional to wavelength //	1	
6(d)(viii)	Wavelength becomes smaller //	1	
6(d)(ix)	Size of slit is bigger than wavelength	1	
7(a)	Spectrum	1	
7(b)(i)	Increases	1	
7(b)(ii)	Decreases	1	
7(b)(iii)	Same / equal	1	
7(c)(i)	The higher the frequency the higher the energy	1	
7(c)(ii)	$V = f \lambda$	1	
7(d)	High frequency means high energy	1	
7(d)	Able to kill cancerous cell	1	
7(e)	Helps doctors to check bones and teeth Helps engineer to check welds and metal joints Kill cancerous cells X-ray diffraction helps scientist to study the arrangement of atoms in various substances Used to detect whether an art piece is genuine or not ** any 2 point, 2 marks	2	

SECTION A

NO.	ANSWER	MARK	
		SUB	TOTAL
8(a)	<p>Convex lens X Mark 1 F Mark 2</p>	1 1	12
8(b)	Real // Diminished // Inverted	1	
8(c)(i)	$1/10 = 1/u + 1/30$ $v = 15 \text{ cm}$	1 1	
8(c)(ii)	$m = 0.5$	1	
8(d)(i)	Objective lens = convex lens Y	1	
8(d)(ii)	Eyepiece = convex lens X	1	
8(d)(iii)	Power of convex lens X is bigger than power of convex lens Y	1	
8(e)	<p>50 cm 10 cm f_o, f_e eyepiece // X Mark 1 Mark 2 objective lens // Y</p>	1 1	

SECTION C

NO.	ANSWER	MARK	
		SUB	TOTAL
11(a)	Object in thermal contact reach the same temperature and no net heat flow.	1	
(b)	Thermal contact- thermometer is placed in the cup of coffee. The heat from water flows to the thermometer The rate of heat flows is same. Called thermal equilibrium. Coffee and thermometer share the same temperature.	1 1 1 1	
(c)	High density High inertia High specific heat capacity Longer time to become hot High strength Hard to break High stiffness Can stand bigger force without changing shape	1 1 1 1 1 1 1 1	
(d)(i)	Q high density, high specific heat capacity, high strength and high stiffness Heat absorbed, $Q_a = \text{Heat released}, Q_r$ $0.2 \times 405 \times (\theta - 30) = 0.3 \times 4200 \times (90 - \theta)$ $\theta = 86.3^\circ$	1 1 1	
(d)(ii)	Lower final temperature of water Copper container absorb heat	1 1	20

SECTION C

NO.	ANSWER	MARK	
		SUB	TOTAL
12(a)	Total resistance in the circuit	1	
(b)	If one bulb is blow the other still can be used Lower the total resistance Easy to trace damage circuit Maintain the potential difference same as the supply through the household appliances	1 1 1 1	
(c)(i)	Control the speed of the fan	1	
(c)(ii)	$1/r = 1/20 + 1/(20+10) @ 1/r = 1/20 + 1/30 @ 1/r = 50/60 @$ $r = 60/50$ $r = 1.2 \Omega$ $1/r = 1/20 + 1/20 @ 1/r = 2/20 @ 1/r = 1/10$ $r = 10 \Omega$	1 1 1 1	
(d)	High melting point Can stand high temperature High conductivity of heat Heat flows easily High resistivity Produce more heat Very low density Not heavy R High melting point, high conductivity of heat, high resistivity and very low density.	1 1 1 1 1 1 1 1 1	20

END OF MARKING SCHEME

4531/3

Fizik
Kertas 3



MAJLIS PENGETUA SEKOLAH-SEKOLAH MENENGAH
NEGERI PULAU PINANG

MODUL PENILAIAN
SIJIL PELAJARAN MALAYSIA 2011

FIZIK
KERTAS 3

SKEMA PEMARKAHAN

Num.	Answer	Mark																																						
1 (a)	<p>(i) State the correct manipulated variable Length / L</p> <p>(ii) State the correct responding variable Resistance / R // Potential difference / V // Current / I</p> <p>(iii) State one fixed variable Diameter of the wire // Cross-sectional area of the wire // Type of wire</p>	1																																						
(b)	<p>Tabulate L, I, V and R correctly Give a tick (\checkmark) based on the following:</p> <p>A • Columns L, I, V and R \checkmark B • Correct units for I, V and R \checkmark C • All values of I correct \checkmark D • All values of I consistent to 2 d.p. \checkmark E • All values of V correct \checkmark F • All values of V consistent to 1 or 2 d.p. \checkmark G • All values of R correct \checkmark H • All values of R consistent to 2, 3 or 4 d.p. \checkmark</p> <table border="1"> <thead> <tr> <th>L / cm</th> <th>I / A</th> <th>V / V</th> <th>R / Ω</th> </tr> </thead> <tbody> <tr> <td>20.0</td> <td>0.36</td> <td>0.4</td> <td>1.11</td> </tr> <tr> <td>30.0</td> <td>0.42</td> <td>0.7</td> <td>1.67</td> </tr> <tr> <td>40.0</td> <td>0.50</td> <td>1.1</td> <td>2.20</td> </tr> <tr> <td>50.0</td> <td>0.62</td> <td>1.7</td> <td>2.74</td> </tr> <tr> <td>60.0</td> <td>0.70</td> <td>2.3</td> <td>3.29</td> </tr> </tbody> </table> <p>Note for G : Accept e.c.f. from C and E</p> <p>Marks awarded :</p> <table border="1"> <thead> <tr> <th>Number of \checkmark</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>8 \checkmark</td> <td>6</td> </tr> <tr> <td>6 - 7 \checkmark</td> <td>5</td> </tr> <tr> <td>4 - 5 \checkmark</td> <td>4</td> </tr> <tr> <td>3 \checkmark</td> <td>3</td> </tr> <tr> <td>2 \checkmark</td> <td>2</td> </tr> <tr> <td>1 \checkmark</td> <td>1</td> </tr> </tbody> </table> <p>Total marks : 6</p>	L / cm	I / A	V / V	R / Ω	20.0	0.36	0.4	1.11	30.0	0.42	0.7	1.67	40.0	0.50	1.1	2.20	50.0	0.62	1.7	2.74	60.0	0.70	2.3	3.29	Number of \checkmark	Marks	8 \checkmark	6	6 - 7 \checkmark	5	4 - 5 \checkmark	4	3 \checkmark	3	2 \checkmark	2	1 \checkmark	1	6
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2 \checkmark	2																																							
1 \checkmark	1																																							

(c)	<p>Draw correctly a graph of R against L Give a tick (✓) based on the following:</p> <ul style="list-style-type: none"> A • R at the y-axis, L at the x-axis ✓ B • Correct units at both axes ✓ C • Uniform scale at both axes ✓ D • 5 points plotted correctly ✓ [Note : 3 or 4 points plotted correctly : ✓] E • Best straight line ✓ F • Minimum size of graph 5×4 big squares ✓ (Big square : $2 \text{ cm} \times 2 \text{ cm}$) (From the origin to the last point) <p>Marks awarded :</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Number of ✓</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>7 ✓</td> <td>5</td> </tr> <tr> <td>5-6 ✓</td> <td>4</td> </tr> <tr> <td>3-4 ✓</td> <td>3</td> </tr> <tr> <td>2 ✓</td> <td>2</td> </tr> <tr> <td>1 ✓</td> <td>1</td> </tr> </tbody> </table> <p>Total marks : 5</p>	Number of ✓	Marks	7 ✓	5	5-6 ✓	4	3-4 ✓	3	2 ✓	2	1 ✓	1	5
Number of ✓	Marks													
7 ✓	5													
5-6 ✓	4													
3-4 ✓	3													
2 ✓	2													
1 ✓	1													
(d)	<p>States the correct relationship based on the straight line drawn For a straight line with positive gradient passing through the origin, Resistance is directly proportional to length / R directly proportional to L / $R \propto L$</p>	1												
(e)	<p>For a straight line with positive gradient that does not pass through the origin, Resistance increases linearly with length</p> <p>States one suitable precaution Check the voltmeter for zero error and make zero adjustment // Position of the eye such that the image of the pointer in the mirror is blocked by the pointer to avoid parallax error</p>	1												
Total		16												

Num.	Answer	Mark
2 (a)	<p>Draw the extrapolation line to the point $(0, 1.00 \times 10^5)$ State the correct atmospheric pressure $1.00 \times 10^5 \text{ atm}$</p>	1
(b)	<p>(i) Calculate the gradient of the graph, k, and state the value of k Draw a sufficiently large triangle (3×3) Correct substitution (follow candidates triangle) Answer with correct unit</p> <p>(ii) Correct substitution State the correct value</p>	1 1 1 1
(c)	<p>Show on the graph using vertical and horizontal dotted line for $h=0.5 \text{ m}$ ($P=1.043 \times 10^5 \text{ Nm}^{-2}$) State the value of $P = 1.043 \times 10^5 \text{ Nm}^{-2}$ (with the correct unit)</p>	1
(d)	<p>(i) State the correct answer Increase</p> <p>(ii) State the correct reason k is directly proportional to density // density increases, k increases</p>	1
(e)	<p>Make sure the eye position is perpendicular to the scale to avoid parallax error.</p>	1
Total		12

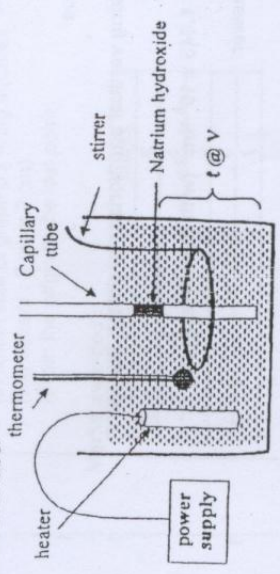
Section B

Num.	Answer	Mark
3 (a)	<p>Making the right inference The volume of gas depends on temperature .</p>	1
(b)	<p>Building an appropriate hypothesis For the fix mass of gas the higher the temperature , the bigger the volume will be.</p>	1
(c)	<p>(i) Stating the aim of the experiment To investigate the relation between the temperature and volume for a fixed mass of gas.</p> <p>(ii) Stating the correct variables State the manipulated variable and the responding variable Manipulated variable : Gas temperature, T Responding variable : Gas volume, V</p>	1 1

State ONE variable that kept constant
 Constant variable : Gas pressure , P // mass of gas, m

(iii) List of appropriate apparatus and material
 Beaker, stirrer , Bunsen burner, capillary tube, tripod stand, thermometer, ruler.

(iv) Describing set up of the apparatus
 Draw and label



(v) Stating the procedure of the experiment
 State the method of controlling the manipulated variable
 1. The apparatus is set up as shown in the diagram above.
 2. Heat up the water with Bunsen burner slowly and stir the water until temperature reach 30 °C.

State the method of measuring the responding variable
 3. Measure the length of the air trapped inside the capillary tube.
 Repeat the experiment at least 4 times
 Repeat the experiment by continuously heat up the water until the temperature reach 4.0°C, 50°C, 60°C and 70°C

(vi) Tabulating data

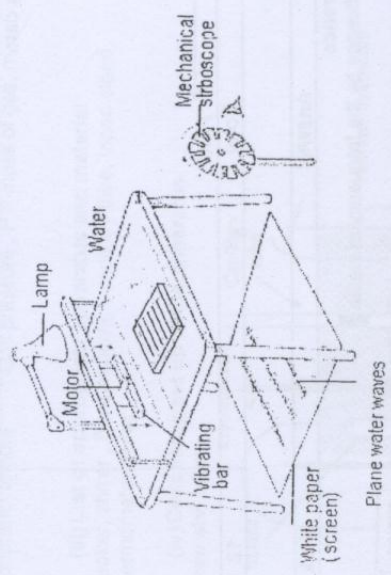
Temperature , T / °C	Temperature, T / K	Volume, V / cm ³ // Length, l / cm
30		
40		
50		
60		
70		

(vii) Analysing data

V / cm^3	T / K
↑	→
Total	
1	12

Num.	Answer	Mark
4 (a)	State a suitable inference The wave length is influence by the frequency of water	1
(b)	States a relevant hypothesis The wave length increases when the frequency of water increase.	1
(c)	(i) State the aim of experiment To study the relationship between the frequency of water and the wave length. (ii) State the manipulated variable and the responding variable Manipulated variable : The frequency of water Responding variable : The wave length. State ONE variable that kept constant Fixed variable : The depth of water. (iii) Complete list of apparatus and materials Ripple tank, stroboscope, metre rule and vibrator motor	1
	Note: A complete apparatus and materials means, with the apparatus and materials a set of data (manipulated and responding variables) can be obtained from the experiment	1

(iv) State the workable arrangement of the apparatus



(v) State the method of controlling the manipulated variable

1. The apparatus is set up as shown in figure.
2. Switch on the vibrator motor at frequency of 10 Hz.

State the method of measuring the responding variable

Observe the waves by using the stroboscope and measure the wavelength.

Repeat the experiment at least 4 times

The experiment is repeated with $f = 20 \text{ Hz}$, 30 Hz , 40 Hz and 50 Hz .

(vi) Tabulating of data

Frequency (Hz)	The wave length (cm)
10	
20	
30	
40	
50	

(vii) State how data will be analysed

The wave length(cm) →

→ Frequency(Hz)

Total 12