

**SKEMA KERTAS 2 PERCUBAAN SPM 2018**

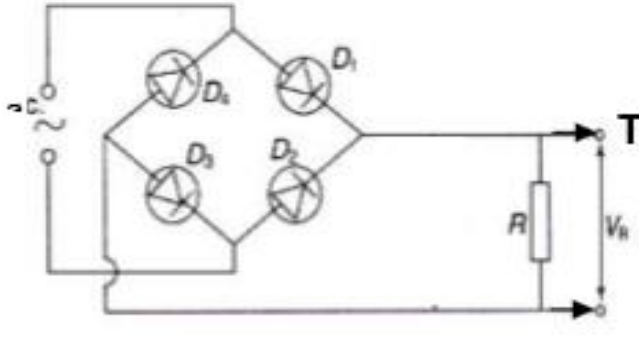
**Marking Script**

**SECTION A**

Question		Marking Scheme		Marks	Total
1.	(a)	Y		1	1
	(b)	Perpendicular		1	1
	(c)	(i)	Increase	1	1
		(ii)	Long wavelength more diffract/ Short wavelength less diffract	1	1
			<b>Total</b>	<b>4</b>	

2	(a)	Pascal's Principle		1	1
	(b)	Force needed to compress the air bubble		1	1
	(c)	(i)	Pressure at X , $P_x = 50 \text{ N} / (10 \times 10^{-4})$ $P_x = 50\,000 \text{ Pa} @ 5 \text{ Ncm}^{-2}$	1 1	2
		(ii)	Weight of load, $W = 50\,000 \times (100 \times 10^{-4})$ $W = 500 \text{ N}$	1	1
			<b>Total</b>	<b>5</b>	

3	(a)	Parallel		1	1
	(b)	$A_1 = 2.0 \text{ A}$ $A_3 = 1.0 \text{ A}$		1	1
	(c)	(i)	$V = 1 \times 4$ $= 4 \text{ V}$	1 1	2
		(ii)	$\frac{1}{4} + \frac{1}{4} // 2$	1	1
		(iii)	$I_1 = I_2 + I_3$	1	1
			<b>Total</b>	<b>6</b>	

4.	(a)	Component that can conduct electricity better than insulator but not good as conductor.	1	1
	(b)	(i) circuit P: Reversed-biased //anode diode connect to negative battery circuit Q: Forward-biased //anode diode connect to positive battery	1 1	2
		(ii) ammeter reading in circuit P is zero and in circuit Q is 2 A	1	1
	(c)	Diode in forward bias allow current flow//Diode in reverse bias not allow current flow	1	1
	(d)	(i) 	All $\sqrt{}$ - 1 m	
		(ii) Full wave rectification	1	1
		(iii) Current smoother/ constant magnitude of dc/	1	1
		<b>Total</b>	<b>7</b>	
5.	(a)	A property of matter that enables an object to return to its size and shape when the force that was acting on it is removed.	1	1
	(b)	(i) Diagram 5.1 in series arrangement. Diagram 5.2 in parallel arrangement.	1	1
		(ii) Diagram 5.1 > Diagram 5.2	1	1
		(iii) Series arrangement, longer extension // Parallel arrangement, shorter extension.	1	1
		(iv) Increase, decreases/ inversely proportional/ spring constant $\propto$ 1/extension	1	1
	(c)	Reduce the diameter of spring coil//increase the diameter of spring//Reduce the length of the spring To increase the spring constant//to increase the stiffness of the spring// less elastic spring// low extension	1 1	2
	(d)	Hooke's law	1	1
		<b>Total</b>	<b>8</b>	



	(c)	(i)	45°, 90°, 45°. Reflect more light./Total internal reflection occur	1 1	2
		(ii)	Increase/ many The number of total internal reflection increase	1 1	2
	(d)		$1 / \sin 42^\circ$ 1.49	1 1	2
			<b>Total</b>	<b>10</b>	
8.	(a)		Thermal equilibrium	1	1
	(b)	(i)	$= 20 - 6 // 14 \text{ cm}$	1	1
		(ii)	$= (16 - 6)/(20 - 6) \times 100$ $= 71.43^\circ\text{C}$	1 1	2
		(iii)	Less than 100°C	1	1
	(c)	(i)	30 – 45//small	1	1
		(ii)	Normal body temperature is 37°C	1	1
		(iii)	Small	1	1
		(iv)	Not too big//increase sensitivity	1	1
		(v)	0.1//small	1	1
		(vi)	Increase sensitivity/accuracy	1	1
		(vii)	Q	1	1
			<b>Total</b>	<b>12</b>	

**SECTION B**

Question		Marking Scheme	Marks	Total																		
9.	(a)	Barometer aneroid	1	1																		
	(b)	Altitude M is lower than N Volume of vacuum chamber in diagram 9.2 is smaller than 9.3 Atmospheric pressure in diagram 9.2 is greater than 9.3	1 1 1	3																		
	(c)	Altitude increases, the volume of vacuum chamber is also increases Altitude increases, the atmospheric pressure decreases	1 1	2																		
	(d)	As the altitude is higher, the temperature decreases/ density of air decrease//air layer become thinner Air molecules move slower// low speed/ kinetic energy decreases Rate of molecules collisions decreases,/rate of change of momentum decreases// frequency of collision decrease Force per unit area decreases, pressure low	1 1 1 1 1	Max 4																		
	(e)	<table border="1"> <thead> <tr> <th>Modifications</th> <th>Explanations</th> </tr> </thead> <tbody> <tr> <td>Use floor pump</td> <td>Has a pressure gauge and are capable of high pressure</td> </tr> <tr> <td>Metal base</td> <td>Stronger and long lasting</td> </tr> <tr> <td>Long handle</td> <td>Better grip</td> </tr> <tr> <td>Wider steel base</td> <td>To provide extra stability during usage</td> </tr> <tr> <td>Larger size of pump</td> <td>Can produce bigger pressure</td> </tr> <tr> <td>Longer cylinder pump</td> <td>To produce higher pressure/ can reduce pumping</td> </tr> <tr> <td>Lower density of pump</td> <td>Lighter , can easily to carry</td> </tr> <tr> <td>Smaller size of nozzle</td> <td>Create higher speed of gas</td> </tr> </tbody> </table>	Modifications	Explanations	Use floor pump	Has a pressure gauge and are capable of high pressure	Metal base	Stronger and long lasting	Long handle	Better grip	Wider steel base	To provide extra stability during usage	Larger size of pump	Can produce bigger pressure	Longer cylinder pump	To produce higher pressure/ can reduce pumping	Lower density of pump	Lighter , can easily to carry	Smaller size of nozzle	Create higher speed of gas	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Max 10
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10	(a)	A wave which the vibration of particles in medium is parallel to the direction of wave propagation		1	1														
	(b)	(i)	displacement of the ping pong ball in Diagram 10.2 > 10.1 amplitude in Diagram 10.2 > 10.1 loudness of the sound in Diagram 10.2 > 10.1	1 1 1	3														
		(ii)	greater loudness, the greater the displacement of the ping pong ball	1	1														
		(iii)	the greater loudness, the greater the amplitude of sound	1	1														
	(c)	when speaker receive input, the diaphragm vibrate air molecules vibrate diaphragm move forward, produced a compression of air molecules in front of the speaker diaphragm move backward, produced a rarefaction of air molecules series of compression and rarefactions produce sound wave// energy transferred direction of vibration of molecules air parallel to the direction of propagation of the waves.// longitudinal waves		1 1 1 1 1	Max 4														
	(d)	<table border="1"> <thead> <tr> <th>Suggestion / Modification</th> <th>Explanation / Reason</th> </tr> </thead> <tbody> <tr> <td>ultrasonic wave // very high frequency of sound wave</td> <td>high frequency // high energy</td> </tr> <tr> <td>high frequency</td> <td>high energy // able to penetrate the deep sea // travel further</td> </tr> <tr> <td>short wavelength</td> <td>less diffracted / travel in narrow beam // less energy loss</td> </tr> <tr> <td>phenomenon reflection wave</td> <td>produce echo // reflected the waves</td> </tr> <tr> <td>transmitter / receiver // transducer</td> <td>to transmit wave / to receive wave</td> </tr> <tr> <td>small percentage of absorption by water</td> <td>able to penetrate the deep sea // less energy loss// more reflect</td> </tr> </tbody> </table>		Suggestion / Modification	Explanation / Reason	ultrasonic wave // very high frequency of sound wave	high frequency // high energy	high frequency	high energy // able to penetrate the deep sea // travel further	short wavelength	less diffracted / travel in narrow beam // less energy loss	phenomenon reflection wave	produce echo // reflected the waves	transmitter / receiver // transducer	to transmit wave / to receive wave	small percentage of absorption by water	able to penetrate the deep sea // less energy loss// more reflect	1 1 1 1 1 1	Max 10
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**SECTION C**

Question		Marking Scheme		Marks	Total												
11	(a)	(i)	The total momentum of a system remains unchanged if no external force acts on the system	1	1												
		(ii)	Air is mixed with the fuel in the combustion chamber produce exhaust Burn/ combustion Hot/ high temperature is pushes out with very high velocity Produces large momentum backward Based on the Principle Conservation of Momentum , same magnitude of momentum forward is produced to push the plane.	1 1 1 1 1	Max 4												
	(b)	<table border="1"> <thead> <tr> <th>Aspect</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>Big opening for air intake</td> <td>More air can be taken in</td> </tr> <tr> <td>Titanium blades</td> <td>Strong and never rusty</td> </tr> <tr> <td>Big combustion chamber</td> <td>More fuel can be burnt,produce bigger momentum</td> </tr> <tr> <td>Small opening for exhaust gas</td> <td>Velocity exhaust gas increase,bigger backward momentum</td> </tr> <tr> <td>Choose : S</td> <td>Because it has large opening for air intake,using titanium blades, big combustion chamber and has small opening for exhaust gases.</td> </tr> </tbody> </table>		Aspect	Explanation	Big opening for air intake	More air can be taken in	Titanium blades	Strong and never rusty	Big combustion chamber	More fuel can be burnt,produce bigger momentum	Small opening for exhaust gas	Velocity exhaust gas increase,bigger backward momentum	Choose : S	Because it has large opening for air intake,using titanium blades, big combustion chamber and has small opening for exhaust gases.	1 1 1 1 1 1 1 1 1 1	10
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	(c)	(i)	$F = ma$ $1.0 \times 10^6 = 4.0 \times 10^5 \times a //$ $a = \frac{1.0 \times 10^6}{4.0 \times 10^5}$ $= 2.5 \text{ ms}^{-2}$	1 1	2												
		(ii)	$v^2 = u^2 + 2as$ $85^2 = 0 + (2 \times 2.5 \times s)$ $s = 85^2 / 5$ $s = 1445 \text{ m}$	1 1 1	3												
<b>Total</b>				<b>20</b>													

Question		Marking Scheme	Marks	Total																		
12.	(a)	Isotope with unstable nucleus and tend to decay	1	1																		
	(b)	Radioisotope is injected into the water pipe. GM tube is used as detector is moved above the ground. If ratemeter show high reading , more radiation detect then the position has leakage If ratemeter show low reading , less radiation detect then the position has no leakage	1 1 1 1	4																		
	(c)	<table border="1"> <thead> <tr> <th colspan="2">Aspects <i>Aspek</i></th> <th>Reasons <i>Sebab</i></th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>State of matter of radioactive is liquid</td> <td>Easily mix with water / Easily flow through the pipe</td> </tr> <tr> <td>2.</td> <td>High penetrating power</td> <td>Can penetrate through the ground</td> </tr> <tr> <td>3.</td> <td>Gamma ray</td> <td>High penetrating power</td> </tr> <tr> <td>4.</td> <td>Short half-life</td> <td>Take shorter time to decay / Does not stay too long in water / Safer to be consumed</td> </tr> <tr> <td>5.</td> <td>Sodium-24 is the most suitable.</td> <td>Because it is in liquid form, has high penetrating power, emits gamma ray and has short half-life.</td> </tr> </tbody> </table>	Aspects <i>Aspek</i>		Reasons <i>Sebab</i>	1.	State of matter of radioactive is liquid	Easily mix with water / Easily flow through the pipe	2.	High penetrating power	Can penetrate through the ground	3.	Gamma ray	High penetrating power	4.	Short half-life	Take shorter time to decay / Does not stay too long in water / Safer to be consumed	5.	Sodium-24 is the most suitable.	Because it is in liquid form, has high penetrating power, emits gamma ray and has short half-life.	1 1 1 1 1 1 1 1 1 1	10
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	(d)	(i) Mass defect / <i>Cacat jisim</i> $= [ 235.04392u + 1.00867u ] - [ 91.92611u + 140.91441u + 3(1.00867u) ]$ $= 0.18606 u$ $= 0.18606 u \times 1.66 \times 10^{-27}$ $= 3.008596 \times 10^{-28} \text{ kg}$	1 1	M1 – m dlm u M2 – m dlm unit kg																		
		(ii) Energy released / <i>Tenaga yang dibebaskan</i> $= mc^2$ $= [ 3.008596 \times 10^{-28} \times ( 3 \times 10^8 )^2 ]$ $= 2.7797 \times 10^{-11} \text{ J}$	1 1 1	M1 – Ganti nilai u M2 – ganti nilai dalam persamaan M3 – jawapan dgn unit yang betul																		
<b>Total</b>				<b>20</b>																		