BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN SPM 2010

FIZIK

PERATURAN PERMARKAHAN

KERTAS 1, KERTAS 2 & KERTAS 3

Physics Paper 1
Trial Examination SBP 2010
Marking Scheme

1	B	**26**	B
2	D	**27**	A
3	D	**28**	A
4	A	**29**	C
5	D	**30**	A
6	C	**31**	B
7	B	**32**	A
8	D	**33**	D
9	C	**34**	A
10	B	**35**	B
11	A	**36**	B
12	C	**37**	C
13	D	**38**	D
14	B	**39**	C
15	B	**40**	B
16	A	**41**	D
17	B	**42**	D
18	D	**43**	D
19	A	**44**	D
20	A	**45**	A
21	C	**46**	C
22	C	**47**	B
23	C	**48**	C
24	A	**49**	A
25	B	**50**	A

[50 *marks*]

MARKING SCHEME PAPER 2, 2010

PART A:

No			Answer	Mark
1	(a)		Maximum displacement from the rest point	1
	(b)	(i)	C	1
		(ii)	The length of pendulum C same as A	1
	(c)		Resonance	1
			Total	**4**
2	(a)	(i)	Bernoulli's principle	1
		(ii)	Y	1
	(b)		Gas flow out the nozzle at highest speed	1
	(c)		1. Air from the outside is pushed (sucked) into the hole 2. Resulting in complete combustion.	1 1
			Total	**5**
3	(a)	(i)	Pressure increases	1
		(ii)	1. Temperature increases// kinetic energy of air molecules increases 2. Hit the wall of the tyre with higher velocity/momentum since the volume of tyre is constant.	1 1
	(b)		Pressure Law	1
	(c)		1. Temperature is change into kelvin scale and correct substitution $\frac{200\ kPa}{303} = \frac{P_2}{333}$ 2. $P_2 = 219.8\ kPa$	1 1
			Total	**6**
4	(a)		When the lift accelerate upwards // Diagram 4(b)	1
	(b)		1. Weight acting downwards 2. Normal force, R acting upwards	1 1
	(c)		500 N // 490 N	1
	(d)		1. R = mg + ma // R = 500 + 100 2. R = 600 N	1 1
	(e)		zero	1
			Total	**7**
5	(a)		Refraction	1
	(b)	(i)	Object distance 5.1 > 5.2	1
		(ii)	Image distance 5.1 < 5.2	1
	(c)		Image must be on the retina.	1
	(d)	(i)	Concave lens	1
		(ii)	Convex lens	1
	(e)		1. Correct shape of lens (concave) drawn in the box 2. Light rays diverge after passing through concave lens then converge on the retina after passing through eye lens.	1 1
			Total	**8**

6	(a)		Resistance is the ratio of potential difference to the current flow // a device that resists/impedes the current/electron flow in a circuit.	1
	(b)	(i)	Cross sectional area 6.2 > 6.1	1
		(ii)	Potential difference 6.1 > 6.2	1
		(iii)	Current for both circuits are the same.	1
	(c)	(i)	Resistance 6.1 > 6.2	1
		(ii)	As the cross sectional area increases, resistance decreases	1
	(d)		1. Decreases 2. Because total/effective resistance decreases	1 1
			Total	**8**
7	(a)		North pole	1
	(b)		1. Increase the number of turns of coil 2. Increase magnitude of current / reduce resistance in the rheostat	1 1
	(c)	(i)	1. Soft iron rod is attracted to the coils 2. Bar magnet pushed away	1 1
		(ii)	1. X becomes South pole and still attract the iron rod 2. Y becomes North pole / same pole as the bar magnet / force of repulsion	1 1
	(d)	(i)	Iron rod is still attracted to the coil	1
		(ii)	Bar magnet will oscillate/ vibrate	1
	(e)		Relay switch // electric bell etc	1
			Total	**10**
8	(a)		The half-life of a radioactive material is the time taken for the activity of radioactive fall to half its original activity	1
	(b)		From graph $T_{1/2}$ = 5000 years	1 1
	(c)	(i)	a: 227 b: 90	1 1
		(ii)	Proton: 89 Neutron: 227-89//138	1 1
	(d)	(i)	-Beta -can penetrate the box	1 1
		(ii)	- Long half-life - Long lasting	1 1
	(e)		C	1
			Total	**12**

PART B:

<table>
<tr><th>NO. 9</th><th>MARKING CRITERIA</th><th colspan="2">MARK</th></tr>
<tr><th></th><th></th><th>SUB</th><th>TOTAL</th></tr>
<tr><td>9(a) (i)</td><td>Sum of two or more forces to produce one resultant force.</td><td>1</td><td>1</td></tr>
<tr><td></td><td>1. Bottle in liquid Q floats lower</td><td>1</td><td></td></tr>
<tr><td>(ii)</td><td>2. Weight and the buoyant force are equal and the same in both cases.</td><td>1</td><td></td></tr>
<tr><td></td><td>3. Density of liquid P is higher.</td><td>1</td><td></td></tr>
<tr><td></td><td>4. As the density of liquid decreases, the lower the bottle floats.</td><td>1</td><td></td></tr>
<tr><td></td><td>5. When density of liquid decreases the volume of liquid displaced increases to produce the same buoyant force.</td><td>1</td><td>5</td></tr>
<tr><td>(b)</td><td>1. When force is applied to piston A</td><td></td><td></td></tr>
<tr><td></td><td>2. Pressure is produced and transmitted uniformly throughout the liquid towards piston B // Pascal’s Principle</td><td>1
1</td><td></td></tr>
<tr><td></td><td>3. Pressure multiply by the surface area of piston B will produce the output force that lift load M.</td><td>1</td><td></td></tr>
<tr><td></td><td>4. Cross-sectional area of piston A is smaller than piston B to produce large output force.</td><td>1</td><td>4</td></tr>
<tr><td>(c)</td><td>
<table>
<tr><th>Suggestion</th><th>Reasons</th></tr>
<tr><td>Fix a long handle on piston A</td><td>Small force can produce bigger force /torque to press piston A</td></tr>
<tr><td>Equip the hydraulic jack with valves</td><td>Liquid can flow in one direction and does not back flow</td></tr>
<tr><td>Use released valves</td><td>Liquid flows back to the storage reservoir</td></tr>
<tr><td>Piston A is made smaller // piston B bigger.</td><td>To produce large output force.</td></tr>
<tr><td>Oil as liquid</td><td>Does not evaporate easily // does not flow out easily// prevent from rust.</td></tr>
</table>
</td><td>2
2
2
2
2</td><td>10

20 marks</td></tr>
</table>

NO.10	MARKING CRITERIA	MARK	
		SUB	TOTAL
10 (a)	Doping is a process of adding a certain amount of specific impurities to semiconductors to increase their conductivity	1	1
(b)	• Diagram 10.1, the p end of diode is connected to negative terminal of dry cell // Diagram 10.2 the p end of diode is connected to positive terminal of dry cell • Bulb in Diagram 10.1 does not lights up • No current flow in Diagram 10.1 // Current flow in Diagram 10.2 • The bulb will lights up when the p end of diode is connected to the positive terminal of dry cell // vice versa • Current only flow in the circuit when p end of diode is connected to positive terminal of dry cell or in forward bias	1 1 1 1 1	5
(c) (i)	Draw correct symbol and correct direction	1	
(ii)	Draw smooth waveform Capasitors **store charge** when current flow Capasitor discharge when current does not flow	3	4
(d)	1 LDR is replace by termistor / diagram 2 resistance decrease when temperature increase 3 Termistor is place at R_1 and R_1 replace LDR / diagram 4 So that V across R_1 increase when the room is hot 5 Relay switch replace LED 6 To switch on secondary circuit /to switch on the fan 7 Fans are arranged parallel 8 All fans received 240 V power supply / other fans still functioning even though one fan did not function 9 Resistor connected to the base of transistor 10 limit the current to the transistor	10	10
			20 marks

PART C:

QUESTION 11:

<table>
<tr><td>(a)</td><td>The Principle of Conservation of Momentum / Energy</td><td>1</td><td>1</td></tr>
<tr><td>(b)</td><td>• When the ball on one end is pulled up and let to fall, it strikes the second ball which is at rest and comes to a dead stop.
• The momentum of the ball becomes zero as its velocity is zero.
• The Principle of Conservation of Momentum states that in a collision between two objects the total momentum of the objects in the system remains unchanged.
• The energy and momentum from the first ball is transferred to the second ball and then transmitted through the balls at rest to the ball on the other end.
• Because the momentum and energy is maintained in this system, the ball on the opposite side will move at the same velocity as the ball that were in initial motion
(any four)</td><td>1
1
1
1
1</td><td>4</td></tr>
<tr><td>(c)</td><td><table><tr><td>The balls touch each other</td><td>This will reduce losses of energy which will reduce the speed of the balls</td></tr><tr><td>The type of material used to make the balls is steel</td><td>Steel balls are hard and produce highly elastic collision. Energy can easily propagates through the intermediate balls.</td></tr><tr><td>Two strings used to hang each ball</td><td>This string arrangement restricts the balls' movements to the same plane.</td></tr><tr><td>the position of the ball to start the oscillation</td><td>High position of the ball, high potential energy and will change to high kinetic energy. The last end ball will swing at bigger speed.</td></tr></table>
The most suitable design is Q because the ball s touch each other, made from steel, use two strings attached to each ball and the initial position of the ball is high.</td><td>2
2
2
2
2</td><td>10</td></tr>
<tr><td>(d)(i)</td><td>$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$
$(5)(0.8) + (3)(0) = 0 + (3)\ v_2$
$v_2 = 1.33\ ms^{-1}$</td><td>1
1</td><td></td></tr>
<tr><td>(ii)</td><td>$m_1v_1 - m_2u_2 = 0 - (0.05)(0.8)$
$= -0.04\ kgms^{-1}$</td><td>1
1</td><td></td></tr>
<tr><td>(iii)</td><td>Impulsive force = -0.04 / 0.05 = 0.8 N</td><td>1</td><td>5</td></tr>
</table>

QUESTION 12:

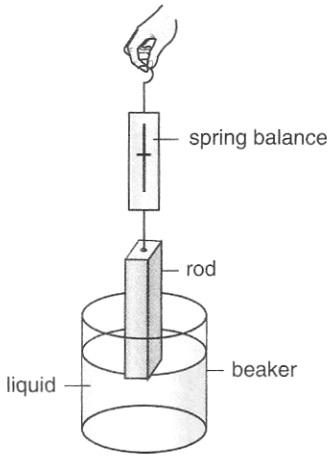
<table>
<tr><th rowspan="2">NO.</th><th rowspan="2">MARKING CRITERIA</th><th colspan="2">MARK</th></tr>
<tr><th>SUB</th><th>TOTAL</th></tr>
<tr><td>12.(a) (i)</td><td>Refraction</td><td>1</td><td>1</td></tr>
<tr><td>(ii)</td><td>wave move from deeper to shallow area
the wavelength decrease
the speed decrease
the direction of wave bends towards normal</td><td>1
1
1
1</td><td>4</td></tr>
<tr><td>(b)</td><td><table><tr><th>Characteristics</th><th>Reason</th></tr><tr><td>Bay</td><td>Wave is calmer</td></tr><tr><td>Concrete retaining wall</td><td>Stronger/ / lasting</td></tr><tr><td>High wall</td><td>Prevent high wave</td></tr><tr><td>Smaller opening/ aperture / slit of retaining wall</td><td>Diffraction obvious // low wave energy</td></tr><tr><td>P</td><td>At bay, concrete retaining wall , high wall and smaller slit</td></tr></table></td><td>2
2
2
2
2</td><td>10</td></tr>
<tr><td>(c) (i)</td><td>$f = \frac{v}{\lambda}$
$= \frac{6}{0.8}$
$= 7.5$ Hz</td><td>1
1
1</td><td>5</td></tr>
<tr><td>(ii)</td><td>$V = \lambda f$
$= 0.5 \times 7.5$
$= 3.75$ cm</td><td>1
1</td><td>20 marks</td></tr>
</table>

MARKING SCHEME PAPER 3 2010

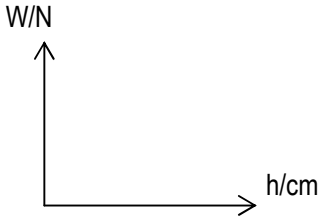
<table>
<tr><td>No. 1</td><td>Answer</td><td>Mark</td></tr>
<tr><td>(a) (i)</td><td>Manipulated variable = Object distance, u</td><td>1</td></tr>
<tr><td>(ii)</td><td>Responding variable = Image distance, v</td><td>1</td></tr>
<tr><td>(iii)</td><td>Constant variable = Volume of water used, V</td><td>1</td></tr>
<tr><td>(b)</td><td>Tabulate u, v and m correctly in the table.
A Shows a table u,v and m.
B State the correct unit of u, v and m.
C All values of u are correct
D All values of v are correct
E All values of m are correct
F State a consistent decimal place for u, v and m.
<table>
<tr><th>u/cm</th><th>v/cm</th><th>m</th></tr>
<tr><td>9.0</td><td>12.2</td><td>1.36</td></tr>
<tr><td>10.0</td><td>11.5</td><td>1.15</td></tr>
<tr><td>11.0</td><td>11.0</td><td>1.00</td></tr>
<tr><td>12.0</td><td>10.4</td><td>0.87</td></tr>
<tr><td>13.0</td><td>9.9</td><td>0.76</td></tr>
<tr><td>14.0</td><td>9.4</td><td>0.67</td></tr>
</table></td><td>6</td></tr>
<tr><td>(c)</td><td>Draw the graph of v against m .
A - Label y-axis and x-axis correctly
B - States the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.
Draw the graph of v against m .
A - Label y-axis and x-axis correctly
B - States the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.
<table>
<tr><th>No of ticks</th><th>Score</th></tr>
<tr><td>6</td><td>5</td></tr>
<tr><td>5</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>
</table></td><td>5</td></tr>
<tr><td>(d)</td><td>State the correct relationship <u>based on the candidate's graph</u>
v is directly proportional to m // v is increasing linearly to m</td><td>1</td></tr>
<tr><td>(e)</td><td>1- The eye's of observer must be perpendicular to the scale reading in order to avoid the parallax error.
2- Repeat the experiment and find the average.</td><td>1</td></tr>
<tr><td></td><td>TOTAL</td><td>16</td></tr>
</table>

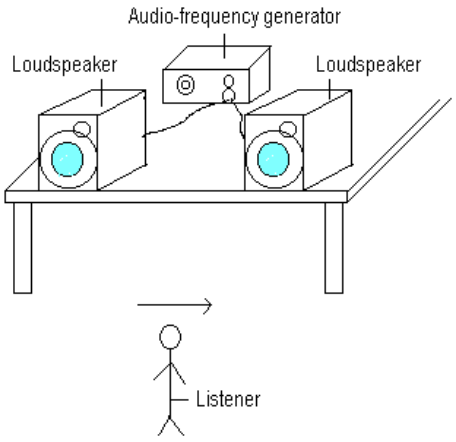
2. (a) (i)	Sin i is directly proportional to sin r.	1
(ii)	-Show the vertical line corresponding to sin r at point 0.4. -Identify the value of sin i = 0.6 -State the value of i correctly = 0.644^0	1 1 1
(iii)	-Draw a sufficiently large triangle minimum (8 x 8) cm -Correct substitution (Follow candidate's triangle) $\frac{0.9}{0.6}$ -Correct answer and no unit 1.5	1 1 1
(b)	n = gradient n = 1.5	1 1
(c)	-Correct substitution $1.5 = \frac{3 \times 10^8}{v}$ -Correct answer with correct unit $v = 2 \times 10^8 \text{ ms}^{-1}$	 1 1
(d)	-<u>State one precaution correctly.</u> 1. Position of eyes are perpendicular to the scale. 2. Repeat the experiment and calculate the average. 3. Make sure do the experiment in the dark room.	 1
		12

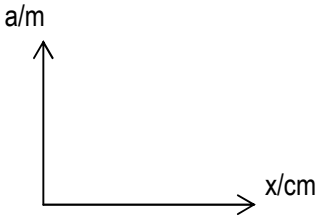
Marking Scheme
Section B

3 (a)	1	**State a suitable inference** The buoyant force can be determined by finding the weight of water displaced
(b)	1	**State a relevant hypothesis** The more the rod is immersed, the lower the reading on the spring balance
(c)(ii)	1	**State the aim of experiment** To investigate the relationship between weight of water displaced and the buoyant force
	1	**State the manipulated variable and the responding variable** **Manipulated :** length of rod below the liquid level **Responding :** weight/ loss in weight
	1	**State <u>ONE</u> variable that kept constant** Density of liquid
	1	**Complete list of apparatus and materials** Beaker, rod, spring balance, metre rule
	1	**Arrangement of apparatus :** 
	1 1	**State the method of controlling the manipulated variable** • A rod which is 10 cm long is marked at intervals of 1 cm and suspended from the hook of a spring balance. • The experiment is started by lowering the rod to depth of 5.0 cm and reading on the spring balance, W is recorded.

<table>
<tr><td></td><td>1</td><td>State the method of measuring the responding variable
• The length of rod below the liquid level is measured and the reading on the spring balance is recorded.

Repeat the experiment at least 4 times
• The experiment is repeated by lowering the rod to different depths, i.e, H = 6.0 cm, 7.0 cm, 8.0 cm and 9.0 cm</td></tr>
<tr><td></td><td>1</td><td>Tabulation of data:<table><tr><td>h/ cm</td><td>W/ N</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td></td><td>1</td><td>Analyse the data .
 
</td></tr>
<tr><td></td><td>Total marks 12</td><td></td></tr>
</table>

4 (a)	1	**State a suitable inference** The distance between 2 loud speaker affect the distance between 2 loud or soft sound.
(b)	1	**State a relevant hypothesis** When the distance between two coherent sources of sound is increase, the distance between two consecutive constructive or destructive interference is decrease.
(c)(ii)	1	**State the aim of experiment** To investigate the relationship between two coherent sources and the distance between two consecutive constructive and destructive interference.
	1	**State the manipulated variable and the responding variable** **Manipulated :** Distance between two coherent sources, a **Responding :** Distance between two consecutive constructive or destructive Interference, x
	1	**State <u>ONE</u> variable that kept constant** Distance between the source and the screen.
	1	**Complete list of apparatus and materials** Loud speaker, audio signal/frequency generator, connection wire, power supply, measuring tape.
	1	**Arrangement of apparatus :** 
	1 1 1	**State the method of controlling the manipulated variable** • By using a metre rule the distance between the listener from the loudspeaker is measured= D • The audio-frequency generator is switched on. • Use a distance between two loud speaker, a= 1.0m. • The listener is requested to walk in a straight path from left to right. **State the method of measuring the responding variable** • the distance between two successive loud regions is measured by a metre rule = x

<table>
<tr><td></td><td></td><td>Repeat the experiment at least 4 times
• The experiment is repeated using a distance between two loud speaker a=1.5m, 2.0m, 2.5m and 3.0m.</td></tr>
<tr><td></td><td>1</td><td>Tabulation of data:
<table>
<tr><td>a/m</td><td>x/m</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>
<tr><td>3.0</td><td></td></tr>
</table></td></tr>
<tr><td></td><td>1</td><td>Analyse the data .
 
</td></tr>
<tr><td></td><td>Total marks 12</td><td></td></tr>
</table>