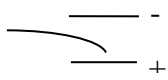
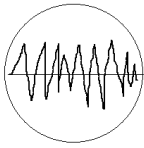
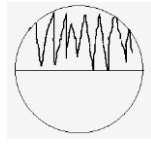

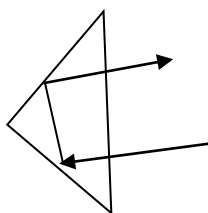


**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012:  
PERCUBAAN SIJIL PELAJARAN MALAYSIA  
SKEMA PAPER 2**

**SECTION A**

Question	Mark Scheme	Sub Mark	Total Mark
1(a)	Fast moving electron / Particles with negative charge	1	1
(b)(i)	Diagram shows path is deflected towards +ve plate <div style="text-align: center;">  </div>	1	
b(ii)	Beta particles has negative charge / attracted to the positive charge at plate	1	2
b(c)	Increases	1	1
TOTAL			<b>4 M</b>
2 (a)	Gravitational potential energy	1	1
(b)(i)	Gravitational potential energy → Kinetic energy	1	1
(b)(ii)	M1 $(10)(50) = \frac{1}{2} v^2$	1	
	M2 $31.62 \text{ ms}^{-1}$	1	2
(c)	The principal of conservation of energy	1	1
TOTAL			<b>5 M</b>
3 (a)(i)	To convert sound into electrical signals.	1	1
(a)(ii)	negative	1	1
(b)	M1 $V_{YZ} = \frac{6 \text{ V}}{(40 + 10) \text{ k}\Omega} \times 10 \text{ k}\Omega$	1	
	M2 $1.2 \text{ V}$ (answer with unit)	1	2
(c)	RS  YZ 	1	2
		1	
TOTAL			<b>6 M</b>
4 (a)	 Bourdon gauge	1	1
(b)	Air/Gas pressure	1	1
(c)(i)	Increases	1	1
(c)(ii)	K.E increses // Rate of collision increases	1	1

Question	Mark Scheme	Sub Mark	Total Mark
(d)	M1 $\frac{130}{27+273} = \frac{136}{T_2}$	1	
	M2 $T_2 = 313.8 \text{ K}$	1	
	M3 $40.8 \text{ }^\circ\text{C}$	1	3
		<b>TOTAL</b>	<b>7M</b>
<b>5(a)</b>	$\frac{\text{Force}}{\text{surface area}}$	1	1
(b)(i)	Diagram 5.2 > Diagram 5.1 // vice versa	1	1
(b)(ii)	Diagram 5.2 > Diagram 5.1 // vice versa	1	1
(b)(iii)	Pressure increases, horizontal distance increases	1	1
(b)(iv)	Depth increases, pressure increases	1	1
(c)(i)	Increases	1	1
(c)(ii)	M1 Atmospheric pressure exerted at the surface of water	1	
	M2 Increases the water pressure	1	2
		<b>TOTAL</b>	<b>8M</b>
<b>6(a)</b>	Vibration of air molecules	1	1
(b)(i)	Diagram 6.2 > Diagram 6.1 // vice versa	1	1
(b)(ii)	Diagram 6.2 > Diagram 6.1 // vice versa	1	1
(b)(iii)	same	1	1
(c)(i)	Displacement increases, amplitude increases	1	1
(c)(ii)	Amplitude increases, loudness increases	1	1
(d)(i)	decreases	1	1
(d)(ii)	Frequency decreases	1	1
		<b>TOTAL</b>	<b>8 M</b>
<b>7(a)</b>	The incidence angle when the refracted angle is $90^\circ$	1	1
(b)(i)		1	1
(b)(ii)	Total internal reflection	1	1

Question	Mark Scheme	Sub Mark	Total Mark
(c)	Light enters at angle $90^\circ$ / perpendicular to the boundary // parallel to the normal line	1	1
(d)(i)	Concave Reflected light is focused to a (focal) point	1 1	2
(d)(ii)	Shiny Good reflector	1 1	2
(d)(III)	Big Collect/capture more light	1 1	2
		<b>TOTAL</b>	<b>10 M</b>
<b>8(a)</b>	1000 J of energy is consumed in 1 s when connected to a 240V power supply	1	1
(b)(i)	M1 $\frac{1000}{240}$ M2 4.17 A (answer with unit)	1 1	2
(b)(ii)	M1 $E = 1000 \times 10^{-3} \times \frac{30}{60} \times 30$ M2 Cost = 15 kWh x 0.23 M3 RM 3.45	1 1 1	3
(c)(i)	$E = 240 \times 6.0 \times 90 // 1.296 \times 10^5 \text{ J}$	1	
(c)(ii)	$E = 240 \times 5.0 \times 150 // 1.800 \times 10^5 \text{ J}$	1	3
(c)(iii)	$E = 240 \times 4.0 \times 120 // 1.152 \times 10^5 \text{ J}$	1	
(d)(i)	R		1
(d)(ii)	M1 Use least of energy M2 Save cost	1 1	2
		<b>TOTAL</b>	<b>12 M</b>

## SECTION B

QUESTION	ANSWER SCHEME	MARKS
9 (a)	Heat absorb to change 1 kg of liquid to gas without any change in temperature.	1
(b) (i)	Boiling point of water is higher	1
	The specific heat capacity of water is higher	1
	The time taken to boil water is longer.	1
(ii)	The lower the boiling point of liquid the smaller the specific heat capacity,	1
(iii)	The smaller the specific heat capacity the shorter the time for liquid to boil.	1
		<b>5</b>

	(c)		1. Alcohol has lower boiling point than water	1	4	
			2. Hence alcohol evaporates easily and readily.	1		
			3. Alcohol has lower latent heat of vaporisation	1		
			4. Hence absorb heat from hand at a faster rate.	1		
	(d)	(i)	Good conductor of heat	Heat can flow easily from plate to fish or from surrounding to plate.	1+1	Any 5 sets of correct answers 10
		(ii)	Low specific heat capacity	Plate increase or decrease in temperature at a faster rate	1+1	
		(iii)	Black colour plate	Good heat absorber	1+1	
		(iv)	Low density plate	Light and easy to handle	1+1	
		(v)	Large surface area of plate	More surface is exposed to heat // more fish can defrost at one time.	1+1	
			TOTAL			<b>20 M</b>
10. (a)	An electromagnet is a conductor which can produce magnetic field when current passes through it.			1	1	
(b)	<ul style="list-style-type: none"> <li>- In diagram 10.2 , the number of turns of the coil is more than diagram 10.1.</li> <li>- More paper clips are attracted to the iron nail in diagram 10.2 than 10.1.</li> <li>- current is the same in diagram 10.2 and 10.1</li> <li>- As the no. of turns increases, more paper clips are attracted to the iron nail.</li> <li>- As the number of turns in the solenoid increases, the strength of the magnetic field increases</li> </ul>			1 1 1 1 1	5	
(c)	<ul style="list-style-type: none"> <li>- The two aluminium rods attract.</li> <li>- Current flowing through the aluminium rod are in the same direction // diagram shows current in the same direction .</li> <li>- The magnetic fields produced by the currents in them will combine to form a resultant/catapult field // show diagram of magnetic fields in opposite direction between the currents .</li> <li>- A weak magnetic field is produced in a region between the aluminium rod because the magnetic field lines are in opposite directions // diagram shows forces are inwards</li> </ul>			1 1 1 1	4	
(d)	<ul style="list-style-type: none"> <li>- Use copper wire, it is very good conductor/resistance is very low.</li> <li>- Use thicker wire to reduce the resistance</li> <li>- Use a laminated core to ovoid the eddy current in the core.</li> <li>- Use soft iron core as it can be magnetized and demagnetized easily/avoid hysteresis .</li> </ul>			2 2 2 2	10	

	- Winding the secondary coil on top of the primary coil to reduce the leakage of magnetic flux.	2	
	<b>TOTAL</b>		<b>20</b>

### SECTION C

<b>ANSWER QUESTION</b> <b>11:</b>	MARKING CRITERIA	MARK													
		SUB	TOTAL												
11.(a)	When force is applied to an enclosed fluid, the pressure produced is transmitted equally throughout the enclosed fluid	1	1												
(b)	-When a small force is applied to piston A, pressure is produced. -The pressure is transmitted equally throughout the whole liquid -When the pressure exerted on surface area of the large Piston B, a bigger force is produced to lift up the load -The force is bigger due to the bigger surface area // $F \propto A$	1 1 1 1	4												
(c)	<table border="1"> <thead> <tr> <th>Characteristics</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>The ratio of surface area of large piston to small piston is large</td> <td>To produce a bigger output force</td> </tr> <tr> <td>Type of liquid used - oil</td> <td>Does not evaporate easily // does not produce bubbles // High viscosity</td> </tr> <tr> <td>Material used for the transmission pipe- steel</td> <td>Strong //Not easy to break // long lasting</td> </tr> <tr> <td>Size of liquid reservoir – big</td> <td>To occupy a large amount of hydraulic liquid // Able to lift load higher // Avoid spill over</td> </tr> <tr> <td>R is chosen</td> <td>Large ratio between large and small piston, use oil, has steel pipe of liquid transmission and has big size of liquid reservoir</td> </tr> </tbody> </table>	Characteristics	Reason	The ratio of surface area of large piston to small piston is large	To produce a bigger output force	Type of liquid used - oil	Does not evaporate easily // does not produce bubbles // High viscosity	Material used for the transmission pipe- steel	Strong //Not easy to break // long lasting	Size of liquid reservoir – big	To occupy a large amount of hydraulic liquid // Able to lift load higher // Avoid spill over	R is chosen	Large ratio between large and small piston, use oil, has steel pipe of liquid transmission and has big size of liquid reservoir	2 2 2 2 2	10
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(d) (i)	$P = \frac{F}{A} = \frac{10}{0.004} = 2500 \text{ Pa}$	1													
(ii)	$F_Y = 2500 \times 0.2 = 500 \text{ N}$	1													
(iii)	$d_y = \frac{0.004 \times 0.3}{0.2} = 0.006 \text{ m}$	1													
	<b>TOTAL</b>		<b>20 marks</b>												

NO.	MARKING CRITERIA	MARK													
		SUB	TOTAL												
12 (a) (i)	<b>State the meaning of radioisotope</b> Unstable isotope	1	1												
(ii)	<b>State the explanation</b> 1. Beta particles penetrates through the paper and 2. detected by the detector	1 1	4												
	3. If the detector detect lower reading the paper is too thick // If the detector detect higher reading the paper is thin	1													
	4. The roller has to compress harder if the paper is thick // Vice versa	1													
(b)	<table border="1"> <thead> <tr> <th>Aspects</th> <th>Reasoning</th> </tr> </thead> <tbody> <tr> <td>Graphite</td> <td>to slow down the fast neutrons produced by the fission.</td> </tr> <tr> <td>Boron / Cadmium</td> <td>to absorb some of the neutrons // reduce the rate of the fission reaction.</td> </tr> <tr> <td>Heavy water</td> <td>To absorb heat from the nuclear reaction. // have high specific heat capacity</td> </tr> <tr> <td>Thick</td> <td>To prevent leakage of radiation from the reactor core</td> </tr> <tr> <td>R is chosen</td> <td>Graphite, Boron, heavy water and thick wall</td> </tr> </tbody> </table>	Aspects		Reasoning	Graphite	to slow down the fast neutrons produced by the fission.	Boron / Cadmium	to absorb some of the neutrons // reduce the rate of the fission reaction.	Heavy water	To absorb heat from the nuclear reaction. // have high specific heat capacity	Thick	To prevent leakage of radiation from the reactor core	R is chosen	Graphite, Boron, heavy water and thick wall	2 2 2 2
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(c) (i)		2	3												
		1													
(ii)	<b>Show the correct conversion to kg</b> $m = 0.19585 \times (1.66 \times 10^{-27})$	1	2												
	<b>Show the correct substitution / answer</b> $E = mc^2$ $= 0.19585 \times (1.66 \times 10^{-27}) \times (3 \times 10^8)^2$ $= 2.92599 \times 10^{-11} \text{ J}$	1													
	<b>Show the correct substitution / answer</b> $P = \frac{E}{t}$	1													
		1													

	$= \frac{2.92599 \times 10^{-11}}{5 \times 10^{-6}}$ $= 5.8512 \times 10^{-10} \text{ W}$		
	<b>Total</b>		<b>20</b>

**END OF SCHEME**