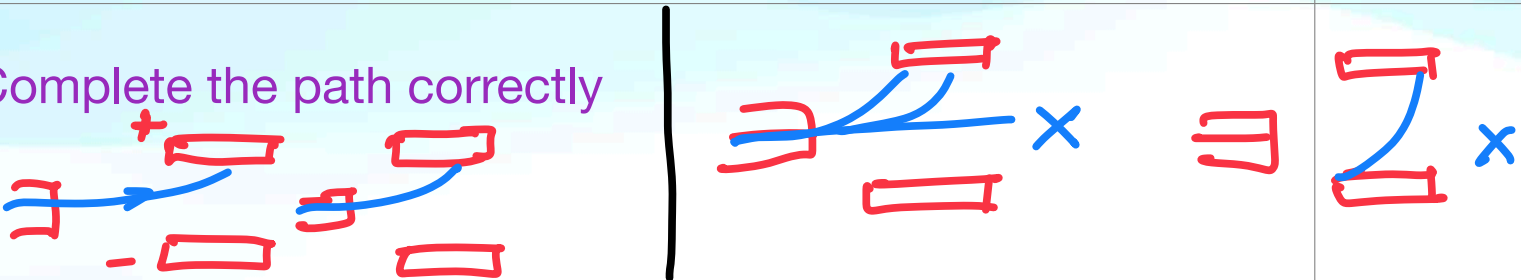


1	(a)	<p>State the correct SI unit for pressure</p> <p>Pascal // Pa // Nm^{-2}</p>	<p>Reject : kPa // <u>p</u>ascal</p>
	(b)	<p>Underline the correct statement in the bracket</p> <p>Pressure at point X is <u>same as</u> pressure at point Y</p>	<p>Reject : selain garis</p>
	(c)	<p>State the physics principle involved.</p> <p>Pascal's // Prinsip Pascal // Pascal</p>	<p>Reject : <u>p</u>ascal</p>
	(d)	<p>State one application correctly</p> <p><u>Hydraulic jack</u> / <u>brake</u> / system / arms / press (machine) / car system / chair</p>	<p>Reject : Toothpaste // car brake</p>

2	(a)	State the meaning of real image correctly <u>Image that can be formed / seen on screen</u>	
	(b) (i)	Determine image distance correctly (40.0 - 30.0) cm // 10.0 cm (awu)	Reject : No decimal point
	(b) (ii)	Calculate focal length correctly $1/f = 1/30 + 1/10$ $f = 7.5 \text{ cm} // 7.50 \text{ cm}$ (awu)	
	(c)	State the change of image correctly <u>Image is brighter</u>	Reject : clearer

3	(a)	Name the process involved correctly Thermionic emission	Reject: wrong spelling
	(b)	Calculate maximum velocity of electron correctly $(1.6 \times 10^{-19})(1500) = \frac{1}{2} (9.11 \times 10^{-31})(v^2)$ (i) $v = 2.295 \times 10^7 \text{ m s}^{-1}$ (qwu)	
	(b)(ii)	Complete the path correctly 	
	(c)	State what happen Deflect upwards <u>greater</u> / <u>more</u> / <u>bigger</u> / higher / increase Give reason correctly <u>Stronger electric field</u>	

4	(a)	<p>State Kepler's third Law correctly</p> <p>The <u>square</u> of the <u>orbital period</u> of any planet is <u>directly proportional</u> to the <u>cube</u> of the <u>radius</u> of its <u>orbit</u>.</p>	
	(b)	<p>Determine radius of satellite M and N correctly</p> <p>Satellite M = 4.237×10^7 m</p> <p>(i) Satellite N = 2.637×10^7 m (a.w.u)</p>	
	(b)(ii)	<p>Determine orbital period Satellite N correctly</p> $\left(\frac{24^2}{4.237 \times 10^7}\right)^3 = \left(\frac{T_N^2}{2.637 \times 10^7}\right)^3 \checkmark^1$ $T_N = 11.784 \text{ h} // 11^{\circ}47'2.4 \checkmark^2 \text{ (a.w.u)}$	

4	(c)(i)	<p>Compare distance A to B and C to D correctly</p> <p>Distance <u>AB</u> is <u>longer</u> / <u>greater</u> / <u>bigger</u> than CD</p>	
	(c) Area AB - X (ii) Area CD - Y	<p>Label the symbol correctly</p>	
	(c)(iii)	<p>Explain your answer correctly</p> <p>X maximum velocity because <u>distance / path AB is longer</u> //</p> <p>Y minimum velocity because <u>distance/ path CD is shorter</u> //</p> <p><u>gravitational force greater at AB</u></p> <p><u>The time for both motion</u> of planet K from A to B and C to D is the <u>same</u></p>	

5	(a)	<p>State the meaning correctly</p> <p>1.5 J work is done / <u>1.5 J of energy required</u> / transferred by an <u>electrical source</u> to move <u>1C of charge</u> in a <u>complete circuit</u>.</p>	
	(b)	<p>Compare arrangement of batteries</p> <p>(Arrangement of batteries in) 5.1 is series // (arrangement of batteries in) 5.2 is parallel</p>	
	(b)(ii)	<p>Compare the total e.m.f. of batteries correctly</p> <p>(Total e.m.f. in Diagram) 5.1 is greater // vice versa</p>	
	(b)(iii)	<p>Compare the gradient of the graph correctly</p> <p>(Gradient of the graph in) Diagram 5.1 is greater // vice versa</p>	<p>Reject : lebih cerun // steeper</p>

5	(c)(i)	<p>State the relationship of batteries arrangement and e.m.f correctly</p> <p>When the arrangement of batteries is series, the total e.m.f. is greater // vice versa</p>	
	(c)(ii)	<p>State relationship of batteries and gradient correctly</p> <p>When <u>arrangement</u> of batteries is <u>series</u>, the <u>gradient</u> is <u>bigger</u> // vice versa</p>	Reject : steeper
	(d)(i)	<p>Calculate internal resistance correctly</p> <p>$E = V + Ir$</p> <p>$6 = 5.8 + (0.5 r)$</p> <p>$r = 0.4 \Omega$</p> <p><i>(q.w.u)</i></p>	
	(d)(ii)	<p>State what happen to internal resistance correctly</p> <p>Increase // bigger</p>	Reject : more

6	(a)	Underline the correct answer(<u>perpendicular</u> / parallel)	
	(b)	Compare angle of incidence correctly (i) (Angle of incidence in both Diagrams are the) same	
	(b)(ii)	Compare wavelength correctly (Wavelength in Diagram) 6.1 is greater // vice versa	
	(b)(iii)	Compare frequency correctly (Frequency in Diagram) 6.1 is lower / smaller // vice versa	
	(c)	Relate wavelength and frequency correctly The higher the wavelength the lower the frequency // vice versa	Reject: $f \propto \frac{1}{\lambda}$

6	(d)	<p>Name the wavelength phenomenon correctly</p> <p><u>Reflection</u>(of water)<u>wave</u></p>	Reject : refraction
	(e) (i)	<p>Give reason why ultrasonic is used correctly</p> <p>High frequency // high energy // can travel / move / propagate further</p>	Reject : penetrate further
	(e)(ii)	<p>Calculate wavelength correctly</p> <p>1500 = (6.0 x 10⁵) ✓ 1</p> <p>λ = 0.0025 m @ 2.5 x 10⁻³ m ✓ 2</p> <p>(a.w.u)</p>	

7	(a)	<p>State the meaning correctly</p> <p>Quantum of energy is <u>discrete energy packet</u> and <u>not a continuous energy</u>.</p>	
	(b)(i)	<p>Determine photon energy correctly</p> $E = [(6.63 \times 10^{-34}) (3 \times 10^8)] / (486 \times 10^{-9})$ $= 4.0926 \times 10^{-19} \text{ J @ } 4.093 \times 10^{-19} \text{ J}$ <p style="text-align: right;">✓ ✓ ~ (a.w.u)</p>	
	(e)(ii)	<p>Calculate output power correctly</p> $P = nhf$ $= 3.37 \times 10^{18} \times 4.0926 \times 10^{-19} = 1.3792 \text{ W @ } 1.379 \text{ W}$ <p style="text-align: right;">✓ (a.w.u)</p>	

7	(c)(i)	<p>State the specification correctly</p> <p>Work function <u>small</u></p> <p>State reason correctly</p> <p>Less energy required for a photoelectron to be emitted from metal surface // photoelectric occur easily // photoelectron release easily</p>	<p>Reject : Small threshold frequency</p> <p><i>more photoe- release</i></p>
	(c)(ii)	<p>State the specification correctly</p> <p>Big <u>(surface area)</u></p> <p>State reason correctly</p> <p>Received more light // Expose to more light // more photoelectron emitted // more sunlight can illuminate</p> <p><i>easily</i></p>	<p>Reject : trap more light // absorbed more light // larger electrical energy</p>
	(d)	<p>Choose the most suitable solar panel</p> <p>A</p>	

8	(a)	<p>Tick the correct answer</p> <p>✓ The rate of change of momentum</p>	
	(b)	<p>Calculate impulsive force correctly</p> $F = (mv - mu)/t$ $= [60(0 - 5)] / 0.8 = -375 \text{ N}$ <p>✓ ✓ ✓ (q.wu)</p>	
	(c)(i)	<p>State the modification correctly</p> <p>Thickness of mattress <u>higher</u> // <u>thicker</u>,</p> <p>State reason correctly</p> <p>Longer time of impact // reduce / lower impulsive force</p>	<p>Reject : thick //</p> <p>reduce injury //</p> <p>absorbed impact</p>

8	(c)(ii)	<p>Suggest the material correctly</p> <p>Natural fiber // rubber // latex // sponge //polyfoam // polyester // memory foam // cotton // wool</p> <p>State reason correctly</p> <p>Longer time impact // smaller impulsive force // not easy to tear</p>	<p>Reject : soft material // reduce injury // absorbed impact // nylon // absorbed force</p>
	(c)(iii)	<p>Suggest the surface area correctly</p> <p>Higher // larger // bigger // wider</p> <p>State reason correctly</p> <p>More space to land // prevent from fall off to ground when bounce // prevent from stumble to ground</p>	<p>Reject : reduce injury // land safely</p>

9	(a)	<p>State the meaning of half life</p> <p><u>Time taken for a sampel of radioactive nuclei to decay to half of its initial number</u></p>	
	(b)	<p>Explain Uranium decay process correctly</p> <ul style="list-style-type: none"> - Amount of Uranium decreases with time - Decay mass / mass of Lead-206 increase - Undecayed mass / mass of Uranium- 238 decreases - The amount of Uranium become half at $T_{1/2}$ - The ratio of Lead-206 to Uranium-238, can determine the age of substance 	Max : 4 M

9	(c)(i)	<p>Calculate time correctly</p> <p>100% $\xrightarrow{1}$ 50 $\xrightarrow{2}$ 25% ✓¹</p> <p>$t = 2 \times 4.5 \times 10^9 = 9.0 \times 10^9$ years ✓² (a.w.u)</p>	
	(c)(ii)	<p>Calculate the age correctly</p> <p>Undecayed Uranium = 100% - 0.73% = 99.27% ✓¹</p> <p>$N = \left(\frac{1}{2}\right)^n N_0$</p> <p>$99.27 = \left(\frac{1}{2}\right)^n 100$</p> <p>$\log 0.9927 = n \log 0.5$ ✓²</p> <p>$n = \frac{\log 0.9927}{\log 0.5}$</p> <p>$n = 0.01057$</p> <p>Age = $0.01057 \times 4.5 \times 10^9$</p> <p>$= 4.76 \times 10^7$ years ✓³ #</p>	

Reject : most ancient

Aspect	Characteristic	Reason
Quantity of Argon	Low ✓ 1	More stable // nukleus become stable ✓ 2
Quantity of Potassium	High ✓ 3	Lower quantity of undecayed nukleus // nukleus become stable ✓ 4
Ratio of potassium to Argon	High ✓ 5	Greater decay // more decay occurs // nuclei become stable ✓ 6
Activity of radioactive	Low ✓ 7	Rock is more stable // rock not radioactive ✓ 8
Choice :	Q ✓ 9	Low quantity of Argon, High potassium, High ratio, low activity ✓ 10

d)				
	Aspect	Characteristic	Reason	
	Quantity of Argon	High X	Be er Argon-40 ^{is the at} was found original number	
	Quantity of Potassium	High Low X	Potassium-40 ^{had been} is already decayed from its original	
	Ratio of Potassium to Argon	Low X	Argon-40 is more than Potassium-40	
	Radioactive activity	High X	^{Argon-40} Decay much more faster until to be Potassium-40	
<p>The most ancient rock is rock P X because it is high quantity of Argon, low quantity of pot Potassium, low ratio of Potassium to Argon and high radioactive activity.</p>				

10	(a)(i)	Name the concept correctly <u>Electromagnetic induction</u>	
	(a)(ii)	State one factor correctly <u>Increase</u> speed / motion / movement of magnet/ copper rod // <u>(increase)</u> strength of magnet // <u>(decrease)</u> distance between the pole magnet	Refer Diagram
	(b)	Explain lighting up the bulb correctly 1- <u>(When shaken the)</u> <u>coil</u> will <u>cut</u> the <u>magnetic flux</u> ✓ 2- <u>e.m.f</u> is <u>induced</u> in the <u>coil</u> ✓ 3- induced current flow in the circuit 4- kinetic energy change to electrical energy 5. The greater the cutting / changing of magnetic flux, the greater the induced emf / induced electric current 6- more charge stored in capacitor on the circuit board.	Max : 3M Reject : light up longer time <u>Wajib 1 dan 2</u>

10	(c)(i)	<p>Determine the ratio of primary turns to secondary turns</p> $\frac{N_p}{N_s} = \frac{240}{5} \Rightarrow N_p : N_s = 48 : 1 \text{ @ } \frac{N_p}{N_s} = \frac{48}{1}$	
	(c)(ii)	<p>Calculate the secondary current correctly</p> $P = VI$ $5 = 5I$ $I = 1 \text{ A}$	
	(c)(iii)	<p>Calculate the input power correctly</p> $\text{Power input} = \text{Power output}$ $= 5 \text{ W}$	

Rej: heat up faster

Aspect	Characteristic	Reason
Material of stove top	Ceramic ✓ 1	High specific heat capacity // low increase in temperature // Easy to be clean ✓ 2
Material of coil	Copper ✓ 3	Low resistivity // low resistance // greater current flow ✓ 4
Coil oxidation rate	Low ✓ 5	Not easy to rust // not easy to oxidized ✓ 6
Source of power supply	AC ✓ 7 Ⓢ	Produced changing of magnetic flux ✓ 8
Choice :	M ✓ 9	Ceramic top, copper coil, low oxidation rate and AC power supply ✓ 10

Aspect	Characteristics	Reason
material of stove top	ceramic ✓ ¹	- High specific heat capacity ✓ ²
material of coil	Nichrome coil X	- absorb more heat - Heat more faster in Q ✓
coil oxidation rate	Low ✓ ⁵	Not oxidise slow rate of oxidising ✓ ⁶
Power supply	✓ ⁷	- can use more longer. - continuous power supply X

X because it have all these ~~etc~~ characteristic.
It has high specific capacity. (5)

(d)	Aspects	Characteristics	Reason
	Material of stove top	Ceramic ✓ 1	It is a good heat insulator ✓ 2
	Material of coil	Nichrome ✗	Good heat conductor
	Coil oxidation rate	Low ✓ 5	To reduce the chance to get rust ✓ 6
	Power supply	Alternating current ✓ 7	Can supply power more <u>efficient</u> ✗

Induction cooker K is ✗ the most suitable. It is because it use ceramic as the material of the stove top which is a good heat insulator, nichrome as the material of the coil that can conduct heat efficiently, has low ^{coil} oxidation rate that can reduce the rate of rusting and ^{use} ^{current} alternating power supply which can supply current more efficient.

5

11	(a)	<p>State the meaning of pressure correctly</p> <p><u>Force per unit area</u> // <u>ratio of force to unit area</u></p>	
	(b)	<p>Observed and compare</p> <p>1-Volume of trapped air in Diagram 11.1(a) is higher than Diagram 11.1(b)</p> <p>2-Reading of pressure gauge in Diagram 11.1(a) is lower than Diagram 11.1(b)</p> <p>3-Reading of thermometer in Both Diagrams are equal / same</p> <p>Relate the volume and the pressure exerted</p> <p>The greater the volume of trapped air, the lower the pressure exerted.</p> <p>Name the law involved.</p> <p>Boyle's Law</p>	<p>Reject :</p> <p>11.1(a) > 11.1(b)</p>

Explain the above situation

1- there is thermal Contact between the boy and the fire

2- heat transfer from fire to the body of the boy

3- heat transfer through radiation from fire to the boy

4- temperature of body increases

5- net heat transfer is not equal to zero

6- temperature of the fire is not equal to body temperature of the boy.

Thermal equilibrium is not achieved.

Max : 4M

Rej: maintain hotness

Aspect	Modification	Reason
Inner layer	High specific heat capacity ✓ 1	Longer time to increase temperature. ✓ 2
Inner layer	Made from heat insulator // polystyrene ✓ 3	Prevent heat lost to surrounding ✓ 4
Inner layer	Shiny colour ✓ 5	Heat reflected to the food ✓ 6
Outer layer	Many layers ✓ 7	Reduce heat loss to the surrounding ✓ 8
Outer layer	Polyester ✓ 9	Waterproof // not wet easily ✓ 10

Wajib
disini

Wajib
disini

Rej: easy to carry - motor carry

Aspect	Modification	Reason
Mass of the bag	Low ✓ 11	Lighter ✓ 12
Density of bag	Low ✓ 13	Lower mass ✓ 14
Safety of the bag	Have zip-lock ✓ 15	Heat trap inside the bag ✓ 16
Size of Bag	Big ✓ 17	Can carry more food at one time. ✓ 18
Safety measure	Bright color bag ✓ 19	Reflect light // easy to be seen by other drivers ✓ 20

wajib
1 disini

d)	Aspect	Characteristics	Reason
	Inner layer	Shiny surface ¹ ✓	- To reflect the heat X - to reduce loss of heat ^{to food}
	Outer layer	- dark colour X plastic material	- to absorb heat X
		- Plastic material X	- to reduce loss of heat X
	mass of the bag	Small ³ ✓	- to reduce release of heat X
	Material of inner layer	Aluminium ⁵ ✓	Heat insulator X
	top of surface of the bag the outer bag	Put zip ⁷ ✓	So the top of the bag don't not open easily X ^④