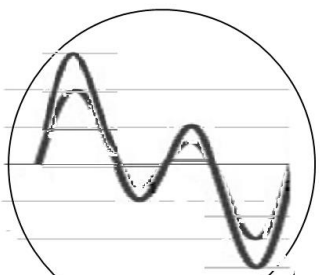
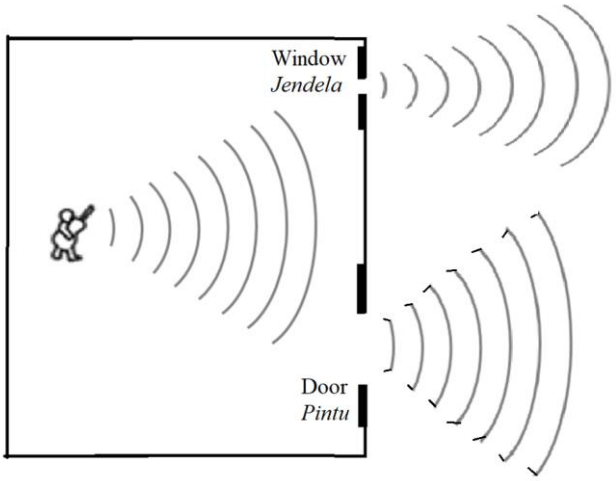
BAHAGIAN A

SOALAN		SKEMA	SUB MARK	MARK
1	(a)	Scalar quantity // Derived quantity *Kuantiti skalar // Kuantiti terbitan*	1	1
	(b)	Show the magnitude of speed only *Hanya tunjukkan magnitud laju sahaja.*	1	1
	(c)	M1 80 kmj^{-1} M2 $\frac{80\ x\ 10^3}{3600}$ // 22.22 ms^{-1}	1 1	2
			TOTAL	**4M**
2	(a)	Falls under the gravitational field strength / gravitational pull only // Falls with g *Jatuh di bawah kekuatan medan graviti / tarikan graviti sahaja // Jatuh dengan g*	1	1
	(b)	M1 v = u + at 0 = 20 + (-10)t M2 t = 2 s.	1 1	2
	(c)(i)	Longer // Increase *Lebih lama // Bertambah*	1	2
	(ii)	Air resistance acting on it // No longer in a free fall state *Rintangan udara bertindak ke atasnya // Tidak lagi dalam jatuh bebas*	1	
			TOTAL	**5M**
3	(a)(i)	Longitudinal waves // mechanical waves *Gelombang membujur// Gelombang mekanikal*	1	2
	(ii)		1	

SOALAN		SKEMA	SUB MARK	MARK
3	(b)(i)	M1 $\frac{330}{1\ x\ 10^3}$	1	4
		M2 0.33 m	1	
	(ii)		1 1	

			TOTAL	**6M**
4	(a)(i)	**Able to state the type of transformer correctly** Step-up transformer *Transformer injak naik*	1	3
	(ii)	**State the answer correctly** M1 The alternating current flows through the primary coil creates changing in magnetic field *A.u. yang mengalir melalui gegelung primer menghasilkan perubahan medan magnet* M2 The changing magnetic field induces a changing potential difference (voltage) across the secondary coil. *Perubahan medan magnet mengaruhkan perubahan voltan merentasi gegelung sekunder.*	1 1	
	(b)	**State the answer correctly** The iron core increases the strength of / concentrate the magnetic field produced. *Teras besi meningkatkan kekuatan / tumpu medan magnet yang dihasilkan.*	1	1
SOALAN		**SKEMA**	**SUB MARK**	**MARK**
4	(c)(i)	**M1 Correct substitution** $85 = \frac{20}{I_p \times 240} \times 100\%$	1	3

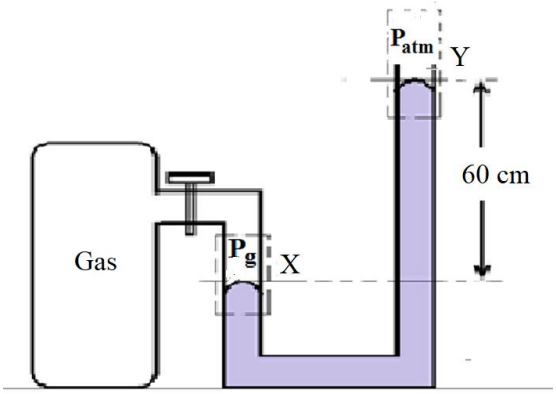
		M2 Correct answer with unit I_p = 0.098 A	1	
	(ii)	**State the answer correctly** Use <u>laminated</u> iron core // bigger diameter of the wire // <u>soft</u> iron core // The secondary coil is winding <u>closely</u> to the primary coils *Guna teras besi berlamina // diameter dawai besar // teras besi lembut // Gegelung sekunder dililit rapat kepada gegelung primer*	1	
			TOTAL	**7M**
5	(a)	**Able to state the definition of temperature correctly** Degree of hotness /coldness // Average of kinetic energy of particles *Darjah kepanasan /kesejukan // purata tenaga kinetik zarah*	1	1
	(b)(i)	**Compare the temperature change correctly** OP – temperature increase *OP – suhu bertambah* QR – temperature constant *QR – suhu malar*	1	1
	(ii)	**Compare the physical state correctly** P: solid *P : pepejal* R: liquid *R : cecair*	1	1
	(iii)	**Relate the changes in temperature and physical**	1	1

		state correctly If there is a changes in temperature, the substance is at one physical state // If tempeature is constant, the substance is at two physical state *Jika ada perubahan dalam suhu, bahan berada pada satu keadaan fizikal // Jika suhu itu malar, bahan itu berada pada dua keadaan fizikal*		
SOALAN		**SKEMA**	**SUB MARK**	**MARK**
5	(c)	**State the answer correctly** Latent heat *Haba pendam*	1	1
	(d)(i)	**State the freezing point correctly** 90 °C	1	2
	(ii)	**State the answer correctly** Melting and freezing begin at the same temperature, depends on either it is cooling or heating *Peleburan dan pembekuan bermula pada suhu sama, bergantung samada penyejukan atau pemanasan*	1	
	(e)	**State the answer correctly** (steam has) **more heat energy** (than water due to its)**latent heat of vaporisation**. *(kerana stim mempunyai)* ***lebih tenaga haba*** *(daripada air)* ***kerana haba pendam pengewapan***	1	1

			TOTAL	8M
6	(a)	npn	1	1
	(b)(i)	Base voltage in Diagram 6.1 is smaller *Voltan tapak dalam Rajah 6.1 lebih kecil*	1	3
	(ii)	Bulb in Diagram 6.1 does not light up / bulb in Diagram 6.2 light up *Mentol dalam Rajah 6.1 tidak menyala / mentol dalam Rajah 6.2 menyala*	1	
	(iii)	No base current flows in Diagram 6.1 / base current flows in Diagram 6.2 *Tiada arus tapak mengalir dalam Rajah 6.1 / arus tapak mengalir dalam Rajah 6.2*	1	
	(c)(i)	When the base voltage is high / present, base current is high / flows *Apabila voltan tapak tinggi / ada , arus tapak tinggi / mengalir*	1	1
SOALAN		**SKEMA**	**SUB MARK**	**MARK**
6	(c)(ii)	When base current increased, collector current increased *Arus tapak bertambah, arus pengumpul* (*Terima simbol*)	1	1
	(d)	Does not light up *Tidak menyala.* Spotlight needs 240V to light up / 6V is not sufficient to light up the spotlight *Lampu sorot memerlukan 240 V untuk menyala / 6V tidak mencukupi untuk menyalakan lampu sorot*	1 1	2
			TOTAL	**8M**
7	(a)	Nuclear fission *Pembelahan nuklear*	1	1

	(b)(i)	$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3\,{}^{1}_{0}n$ + Energy *Tenaga*	1 1	2
	(ii)	M1 mass defect, m = 236.0529 - 235.8653 // 0.1876 u M2 $E = mc^2$ // $(0.1876 \times 1.66 \times 10^{-27})(3 \times 10^8)^2$ M3 2.80×10^{-11} J	1 1 1	3
	(c)(i)	Disposable gloves / remote control through a glass-lead screen / use forcep //wear a flim badge //any similar ideas *Sarung tangan pakai buang /alat kawalan jauh melalui skrin kaca – plumbum / guna penyepit// memakai lencana filem // idea setara*	1	4
		To avoid direct contact // to warn /inform permanent record of radiation dose received *Mengelak sentuhan langsung // untuk memberi amaran / maklumat kekal rekod sinaran yang di terima*	1	
	(ii)	Solidified in concrete and buried underground //any similar ideas *Dipejalkan dalam konkrit dan ditanam bawah tanah // idea setara* To avoid radiation from released to the surrounding *Mengelak sinaran radioaktif daripada terlepas ke persekitaran*	1 1	
			TOTAL	**10M**

SOALAN		SKEMA	SUB MARK	MARK
8	(a)	$\frac{\text{Force}}{\text{Area}}$ / Force per area	1	1

		$\frac{Daya}{Luas}$ / *Daya per luas*		
	(b)(i)		1, 1	2
	(ii)	Pg = Patm + ρhg = 76 + 60 = 136 cm Hg	1 1	2
	(c)(i)	Elastic pumping bulb *Bebola pengepam kenyal*	1	1
		Easy to pump /can pump continously *Mudah untuk mengepam / boleh pam berterusan*	1	1
	(ii)	Nylon *Nilon*	1	2
		Strong // durable // withstand high pressure // longetivity // easy to clean // not easy to tear *Kuat / lasak // tahan tekanan tinggi // tahan lama // mudah basuh // tidak mudah koyak*	1	
	(iii)	Release valve screw *Skru injap pelepas*	1	2

		Flow mercury back to its original position *Mengalirkan merkuri balik ke tempat asalnya*	1	
	(iv)	Q	1	1
			TOTAL	**12M**

BAHAGIAN B

SOALAN		SKEMA	SUB MARK	MARK
9	(a)	Energy is the possessed by an object due to its height / position *Tenaga dimiliki oleh objek disebabkan oleh ketinggiannya / kedudukan*	1	1
	(b)	M1 Mass of load in Diagram 9.2 is greater *Jisim beban dalam Rajah 9.2 lebih besar* M2 Gravitational potential energy of load in Diagram 9.2 is greater *Tenaga keupayaan graviti dalam Rajah 9.2 lebih besar* M3 Power output in Diagram 9.2 is greater *Kuasa output dalam Rajah 9.2 lebih besar* M4 Mass increase , gravitational potential energy increase *Jisim bertambah, tenaga keupayaan graviti Bertambah* M5 Mass increase, output power increase *Jisim bertambah, kuasa bertambah*	1 1 1 1 1	5

	(c)	M1 Rough surface has friction on the surface *Permukaan kasar mempunyai geseran*	1	
		M2 Weight component acting along the inclined plane *Komponen berat bertindak sepanjang satah Condong*	1	
		M3 Friction and weight component against the motion on inclined plane *Geseran dan komponen berat menentang gerakan di atas satah condong*	1	4
		M4 Work done = mgh + work to overcome the friction and weight component *Kerja yang dilakukan = mgh + kerja untuk mengatasi geseran dan komponen berat*	1	
SOALAN		**SKEMA**	**SUB MARK**	**MARK**

9	(d)			

Aspects ***Aspek***	**Reason** ***Sebab***
Handle : Long *Pemegang - panjang*	Can grab with two hands/ Balance / better control once the fish is hooked *Boleh dipegang dengan dua tangan / seimbang / kawalan yang lebih baik sebaik sahaja ikan tertangkap*
Keel: Low density *Kekili : Ketumpatan rendah*	Small mass / light assist in pulling fish *Jisim kecil / ringan / bantu dalam menarik ikan*
Ring : small diameter *Cincin : diameter kecil*	not easy to get tangled *tidak mudah kusut*
Fishing line - nylon / strong / durable *Tali joran – nilon / kuat / lasak*	Durable/ Not easily break *Lasak / Tidak mudah putus*
Fishing rod : fibreglass // carbon fibre // bamboo // flexible material *Joran – kaca fiber // fiber karbon // buluh // fleksibel*	Withstand big force / strong / Can bend *Tahan daya besar / kuat / boleh bengkok*

1 , 1

1 , 1

1 , 1

1 , 1

1 , 1

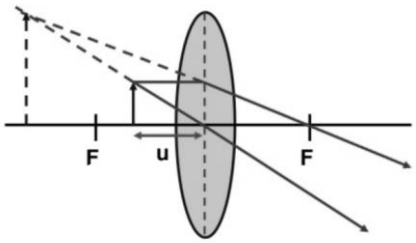
10

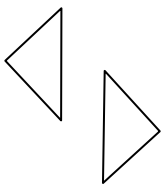
			TOTAL	**20M**
10	(a)	The filament lamp uses 12 J of energy in 1 s when 6 V of voltage is applied across the lamp. *Filamen menggunakan 12 J tenaga dalam 1 s apabila 6 V voltan dibekalkan merentasi lampu.*	1	1
	(b)	Filament lamp graph is curve in shape, while the constantan wire conductor is a straight line/ linear graph *Graf lampu filamen adalah melengkung, sementara*	1	1

<table>
<tr><td></td><td></td><td>graf dawai konstantan adalah garislurus /graf linear</td><td></td><td></td></tr>
<tr><th colspan="2">SOALAN</th><th>SKEMA</th><th>SUB MARK</th><th>MARK</th></tr>
<tr><td rowspan="5">10</td><td rowspan="4">(b)</td><td>The gradient of the graph for filament lamp is increases while the gradient of the graph for the constantan wire is constant.
Kecerunan graf untuk lampu filamen bertambah sementara kecerunan graf bagi dawai konstantan malar</td><td>1</td><td>1</td></tr>
<tr><td>The resistance for filament lamp is increases while for the constantan wire is constant.
Rintangan untuk lampu filamen bertambah sementara bagi dawai konstantan malar</td><td>1</td><td>1</td></tr>
<tr><td>If the graph is curve in shape, the resistance is change // if the graph is a straight line /linear graph, the resistance is constant.
Jika graf adalah berbentuk melengkung, rintangan berubah // jika graf adalah graf garis lurus/ linear rintangan adalah malar</td><td>1</td><td>1</td></tr>
<tr><td>The constantan wire is an Ohmic conductor.
Dawai konduktor adalah konduktor Ohm</td><td>1</td><td>1</td></tr>
<tr><td>(c)</td><td><table>
<tr><td>Filament must be made from tungsten wire
Filamen harus dibuat daripada dawai tungsten</td><td>Higher resistance per unit length / high resistivity / high resistance
Rintangan per unit panjang yang lebih tinggi / kerintangan tinggi / rintangan tinggi</td></tr>
<tr><td>Small cross-sectional area of the wire
Luas keratan</td><td>High resistance // (R α $\frac{l}{A}$) , A = cross-sectional area // becomes hot easily.
Rintangan tinggi // (R α $\frac{l}{A}$) ,</td></tr>
</table></td><td>1,1</td><td></td></tr>
</table>

		rentas dawai yang kecil	*A = luas keratan rentas dawai//dawai lebih cepat panas.*	1,1	
		The tungsten wire is coiled. *Dawai tungsten adalah bergegelung.*	A coiled wire is more efficient because a very long wire can be fitted into the glass bulb //	1,1	
SOALAN		**SKEMA**		**SUB MARK**	**MARK**
10	(c)				
			concentrating the heat // producing brighter light from the hot filament *Dawai bergegelung adalah lebih berkesan kerana dawai yang panjang dapat dimasukkan ke dalam lampu // menumpukan haba // menghasilkan cahaya yang lebih cerah daripada filamen panas.*		10

		The glass lamp is filled with inert gas/ nitrogen/ argon/ neon *Lampu diisi dengan gas gas nadir/adi/nitrogen/ neon/argon*	prevent oxidation *Mengelakkan pengoksidaan*	1,1	
		The glass lamp is filled with gas at low pressure. *Lampu kaca diisikan dengan gas pada tekanan yang rendah*	Reduce evaporation *Mengurangkan penyejatan*	1,1	
	(d)	M1 D10.4 (b) – the lamps are arranged in parallel *R10.4 (b) – lampu dipasang selari* M2 the voltage across each lamp is equals to the voltage of the supply voltage *voltan merentasi setiap lampu adalah sama dengan voltan bekalan kuasa*		1 1	2
SOALAN		**SKEMA**		**SUB MARK**	**MARK**
10		M3 more electric current flows through it. (V= IR, R is the resistance of the filament). *arus elektrik mengalir melaluinya lebih (V= IR, R adalah rintangan lampu)*		1	2

		M4 more power output (P = V x I) *Lebih kuasa output (P = V x I)*	1	
			TOTAL	**20M**
BAHAGIAN C				
11	(a)(i)	Convex *Cembung*	1	1
	(ii)	M1 u < f / Diagram *u < f / Rajah*	1	4
		M2 Diagram shows two rays - Ray 1 : refracted towards the focal point, F - Ray 2 : pass through the center of lens *Rajah menunjukkan dua sinar* - *Sinar 1 : terbias ke titik fokus, F* - *Sinar 2 : melalui pusat kanta*	1	
		M3 Diagram shows extrapolation of the two rays and a virtual image formed *Rajah menunjukkan dua sinar diekstrapolasi dan imej maya terbentuk*  	1 1	

		M4 Virtual and upright image *Imej maya dan tegak*		
	(b) (i)	M1 $\frac{1}{-10.0} = \frac{1}{20.0} + \frac{1}{v}$ M2 - 6.7 cm	1 1	2
SOALAN		**SKEMA**	**SUB MARK**	**MARK**
11	(b)(ii)	M1 $\frac{h_i}{h_o} = \frac{v}{u}$ M2 $\frac{h_i}{10.5} = \frac{6.7}{20.0}$ M3 3.5 cm	1 1 1	3
	(c)	M1 Arrangement *Susunan*  M2 Total internal reflection occurs twice *Pantulan dalam penuh berlaku dua kali* M3 45^o - 90^o - 45^o M4 Enable total internal reflection happens	1 1 1	10

		Membolehkan pantulan dalam penuh berlaku	1	
		M5 Glass *Kaca*	1	
		M6 Not easy to scratch // Produce clearer image *Tidak mudah calar // Hasil imej yang lebih jelas*	1	
		M7 Small critical angle *Sudut genting kecil*	1	
		M8 Total internal reflection easily occurs *Pantulan dalam penuh mudah berlaku*	1	
		M9 L	1	
		M10 (*Correct M1/M2, M3/M4, M5/M6, M7/8*)	1	
			TOTAL	**20M**

SOALAN		SKEMA	SUB MARK	MARK
12	(a)	Waves that does need any medium to propagates *Gelombang yang tidak perlukan medium untuk merambat*	1	1
	(b)(i)	M1 UV light is shined to the bill/ money	1	2

		Cahaya UV disinari kepada duit M2 If a printed image appears on the bills the bill is authentic *Jika imej tercetak muncul diatas duit maka duit itu yang sebenar*	1	
	(ii)	M1 Microwaves vibrates water/fat/sugar molecule *Gelombang mikro menggetarkan molekul air/lemak/ gula* M2 Heat is produces /generated *Haba dijanakan*	1 1	2
	(c)(i)	M1 $s = v \times \frac{t}{2}$ M2 $3.0 \times 10^8 \times (\frac{4.0 \times 10^{-5}}{2})$ M3 6.0×10^3	1 1 1	3
	(ii)	M1 $\lambda = \frac{V}{f}$ $= \frac{3.0 \times 10^8}{3 \times 10^{15}}$ M2 1×10^{-7} m	1 1	2
		<table><tr><td>Aspect *Aspek*</td><td>Explanation *Penerangan*</td></tr><tr><td>M1 Rotating liner *Pelapik berputar*</td><td>M2 Heat food evenly *Panaskan makanan*</td></tr></table>	1, 1	10

			seragam		
		M3 Material of the liner plate - glass *Bahan pinggan pelapik - kaca*	M4 Avoid reflection to the magnetron *Elakkan pantulan ke magnetron*	1, 1	
		M5 Step up transformer *Transformer Injak naik*	M6 Increase voltage *Menaikkan voltan*	1, 1	
		M7 Door metal mesh – small hole *Pintu jejaring logam – lubang kecil*	M8 Avoid microwave out of the oven *Elak gelombang mikro keluar dari oven*	1,1	
		M9 R	M10 *M1/M2, M3/M4, M5/M6, M7/8*	1, 1	
				TOTAL	**20M**

END OF MARKING SCHEME.

PERATURAN PEMARKAHAN TAMAT.