Yakin
Pustaka Yakin Pelajar Sdn. Bhd.

KERTAS SOALAN PEPERIKSAAN SEBENAR SPM 2021

FORMAT TERKINI

+3 SET KERTAS MODEL FORMAT INSTRUMEN SPM TERKINI

FIZIK

Bilingual

SIJIL PELAJARAN MALAYSIA 2021

KERTAS 1 / *Paper 1*

1 **C** Kuantiti asas: panjang, jisim, masa, suhu termodinamik, arus elektrik, keamatan berluminositi dan jumlah bahan
Base quantity: *length*, *mass*, *time*, *thermodynamic temperature*, *electric current*, *luminous intensity and amount of substance*

2 **B** Disebabkan inersia, pemandu dan penumpang akan terus bergerak ke hadapan dengan halaju tetap dan menghentam stering dan cermin hadapan apabila kereta berhenti secara tiba-tiba.
Due to inertia, the driver and passengers will continue moving forward with constant velocity and hit the steering or windscreen when the car stops in a sudden.

3 **A** Daripada persamaan $s = ut + \frac{1}{2}gt^2$, apabila s tetap dan u sifar, g berkadar songsang dengan t. Kekuatan medan graviti, g Bulan adalah lebih rendah berbanding Bumi, maka masa yang diambil untuk kotak sampai ke permukaan, t adalah lebih panjang.
From the equation $s = ut + \frac{1}{2}gt^2$, *when* s *constant and* u *zero*, g *is inversely proportional to* t. *Gravitational field strength*, g *on the Moon is less than that on Earth*, *hence the time taken by the box to reach the surface*, t *are longer*.

4 **B** Kecerunan graf sesaran-masa menunjukkan halaju objek.
0 – P: Halaju malar, 1 m s^{-1}
PQ: Halaju sifar, 0 m s^{-1}
QRS : Halaju malar (pada arah bertentangan), –1 m s^{-1}
Gradient of a displacement-time graph shows velocity of object.
0 – P : *Constant velocity*, 1 m s^{-1}
PQ : *Zero velocity*, 0 m s^{-1}
QRS : *Constant velocity* (*opposite direction*), –1 m s^{-1}

5 **A** $v^2 = u^2 + 2gs$
$= 0 + 2(9.81)(5)$
$v = 9.9045$ m s^{-1}

6 C Daripada persamaan $v = \sqrt{\frac{2GM}{r}}$, halaju lepas dipengaruhi oleh jisim Bumi, M dan jarak objek dari pusat Bumi, r.

From the equation $v = \sqrt{\frac{2GM}{r}}$, *escape velocity is influenced by the mass of the Earth*, M *and the distance of the object from the centre of Earth*, r.

7 B Apabila $r < R$, nilai g berkadar terus dengan jarak dari pusat Bumi. Apabila $r \geq R$, nilai g berkadar songsang dengan jarak dari pusat Bumi.
When $r < R$, *the value of* g *is directly proportional to the distance from the centre of the Earth*. *When* $r \geq R$, *the value of* g *is inversely proportional to the distance from the centre of the Earth*.

8 B Ciri-ciri satelit bukan geopegun: Arah putarannya tidak semestinya sama dengan arah putaran Bumi, tempoh orbitnya melebihi atau kurang daripada 24 jam, kedudukannya berada di atas kedudukan geografi yang berubah-ubah di permukaan Bumi serta digunakan untuk pengimejan Bumi, GPS dan ramalan cuaca.
Characteristics of non-geostationary satellite: *Direction of rotation need not be the same as the direction of the Earth rotation*, *orbit period can be more or less than* 24 *hours*, *the position of satellite is above the changing locations on the surface of the Earth and use for earth imaging*, *GPS and weather forecast*.

9 C Daya graviti/*Gravitational force*:

$$F = \frac{GMm}{r^2}$$
$$= \frac{(6.67 \times 10^{-11})(5.94 \times 10^{24})(54)}{(6.37 \times 10^{6})^2}$$
$$= 527.26 \text{ N}$$

10 C Daripada $FD = mv^2$, $v^2 = \frac{1}{m} FD$, di mana FD ialah kecerunan (malar)

From $FD = mv^2$, $v^2 = \frac{1}{m} FD$, *where* FD *is the gradient* (*constant*)

11 A Hukum Charles: Apabila suhu gas berkurang, tenaga kinetik purata molekul berkurang dan kadar perlanggaran antara molekul udara dengan dinding botol berkurang, halaju berkurang. Untuk mengekalkan tekanan, isi padu gas berkurang (jarak antara molekul udara berkurang), maka kadar perlanggaran molekul dan dinding botol tidak berubah.
Charles law: *When the temperature of gas decreased*, *the average kinetic energy of molecules decreases and the rate of collision between air molecules and the inner wall of the bottle decreases*, *velocity decreases*. *To maintain the pressure*, *the volume of the gas decreases*, *so that the rate of collision between the gas and the inner wall of the bottle does not change*.

12 A Haba pendam pelakuran suatu bahan ialah kuantiti haba yang diserap semasa peleburan atau dibebaskan semasa pembekuan bahan tanpa perubahan suhu.
Latent heat of fusion of a substance is the quantity of heat absorbed during melting or released during solidification of the substance without a change in temperature.

13 B Panjang K sama dengan panjang X, maka frekuensi aslinya sama dengan frekuensi X.
Length of K *is equal to length of* X, *therefore the natural frequency is equal to frequency* X.

14 C Fenomena pembiasan. Panjang gelombang berkurang apabila kedalaman berkurang.
Phenomenon is refraction. *Wavelength decreases when depth decreases*.

15 A Frekuensi gelombang ultrasonik melebihi 20 kHz digunakan dalam telekomunikasi jarak dekat.
Frequency of ultrasonic wave exceeds 20 kHz, *used in short range telecommunications*.

16 A $u = 2f$
Ciri-ciri imej: Nyata, songsang dan sama saiz.
Characteristics of image: *Real*, *inverted and same size*.

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17 D Daripada rajah dan $m = \frac{v}{u} = \frac{h_i}{h_o}$, jarak objek, u berkadar songsang dengan ketinggian imej, h_i.

From diagram and $m = \frac{v}{u} = \frac{h_i}{h_o}$, *object distance*, u *is inversely proportional to the height of image*, h_i.

18 D Imej dari kanta kamera: Jarak objek dekat menghasilkan imej yang besar, jarak objek yang jauh menghasilkan imej yang kecil.
Image from camera lens: *Object distance shorter produced bigger image*, *object distance longer produced smaller image*.

19 B Daripada gabungan / *From combination of* $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ dan / *and* $m = \frac{v}{u}\left(u = \frac{v}{m}\right)$;

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

$$\frac{1}{f} = \frac{1}{\frac{v}{m}} + \frac{1}{v}$$

$$\frac{1}{f} = \frac{m}{v} + \frac{1}{v}$$

$$\frac{1}{f} = \frac{m+1}{v}$$

$v = fm + f$, f ialah pintasan-y, X
f *is y-intercept*, X

20 B $F_x = 500 \text{ kos/cos } 60^0$
$= 250^0$

21 D Daripada F = ma, pecutan, a berkadar songsang dengan jisim, m.
From F = ma, *acceleration*, a *is inversely proportional to the mass*, m.

22 D $F_{net} = 1\,000 \sin 30^0 + 850 - 150$
$= 500 \text{ N} + 850 \text{ N} - 150 \text{ N}$
$= 1\,200 \text{ N}$

23 C Ketinggian turus merkuri menunjukkan tekanan atmosfera.
The height of mercury column shows atmospheric pressure.

24 D Faktor yang mempengaruhi tekanan air ialah kedalaman.
Factor that affects water pressure is the depth.

25 D $P = \frac{F}{A}$

$150 = \frac{F}{200}$

$F = 30\,000 \text{ N}$

26 A $F = ma$

$W - F_B = ma$

$2\,500 - 2400 = 250a$

$a = 0.4 \text{ m s}^{-2}$

27 D Apabila beza keupayaan antara plat logam bertambah, kekuatan medan elektrik bertambah.
When potential difference between metal plates increases, *electric field strength increases*.

28 B Apabila rintangan dawai berkurangan (dawai lebih tebal), arus yang mengalir melalui mentol bertambah.
When resistance decreases (*thicker wire*), *the current flows through bulb increases*.

29 C
$$P = \frac{V^2}{R}$$
$$= \frac{240^2}{25}$$
$$= 2\,304 \text{ W}$$

30 B Nilai r = kecerunan graf/*Value of* r = *gradient of the graph*:
$$r = \frac{0.5 - 3.0}{3.0 - 0}$$
$$-r = 0.833\ \Omega$$

31 A Penjana elektrik arus terus menggunakan dua gelang gelincir. Dalam keadaan mendatar, gegelung memotong fluks magnet menghasilkan arus aruhan yang maksimum.
Alternating current generator uses two split rings. In horizontal position, *the coil cut the magnetic field and produced maximum alternating current*.

32 B Daya lastik bertambah apabila kekuatan medan magnet bertambah dengan menggunakan magnet melengkung.
Catapult force increases when the strength of magnetic field increases by using a curve magnet.

33 C Kecekapan transformer (voltan output tinggi) boleh ditingkatkan dengan mengurangkan kehilangan tenaga dengan menggunakan gegelung dawai kuprum yang tebal, teras besi berlamina, teras besi lembut dan gegelung sekunder melilit gegelung primer.
Efficiency of transformer (*higher output voltage*) *can be increased by reducing energy loss by using thicker copper wire coil, laminated iron core*, *soft iron core and winding the secondary coil on the primary coil*.

34 C Diod hanya membenarkan arus mengalir melalui satu arah (pincang hadapan).
Diode allows current to flow in one direction only (*in forward biased*).

35 C Rektifikasi gelombang penuh. Dalam kitar separuh positif, arus melalui M-N-T-S.
Full wave rectification. *During positive half cycle*, *current flows through* M-N-T-S.

36 B Katod disambungkan ke terminal negatif manakala anod disambungkan ke terminal positif bekalan kuasa. Elektron dibebaskan apabila filamen pada katod dipanaskan. Elektron memecut dengan halaju tinggi menuju ke anod.
Cathode connected to the negative terminal, *while anode connected to the positive terminal of the power supply. Electrons released when the filament in cathode was heated. Electrons accelerate at high velocity towards anode*.

37 A Mengendalikan bahan radioaktif menggunakan lengan robotik mengurangkan risiko terdedah kepada bahan radioaktif.
Handling radioactive materials using robotic arms reduce the risks of being exposed to the radioactive materials.

38 D Fungsi rod kawalan boron: Menyerap neutron berlebihan. Fungsi moderator grafit: Memperlahankan kelajuan neutron.
Function of the boron control rod: *Absorb the excessive neutron*. *Function of the graphite moderator*: *Slows down the speed of neutron*.

39 C Tenaga nuklear merupakan sumber tenaga bersih yang tidak memberi kesan kepada ekosistem dan jejak karbon.
Nuclear energy is clean and no effect to the ecosystem and carbon footprint.

40 C Nukleus yang lebih ringan (Hidrogen) bergabung membentuk satu nukleus yang lebih berat dan membebaskan tenaga yang tinggi.
Lighter nuclei (*Hydrogen*) *fuse together to form a single heavier nucleus and releasing enormous energy*.

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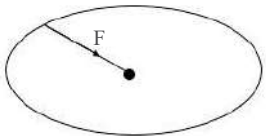
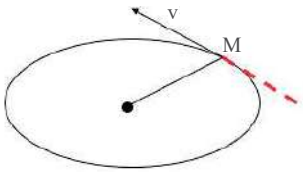
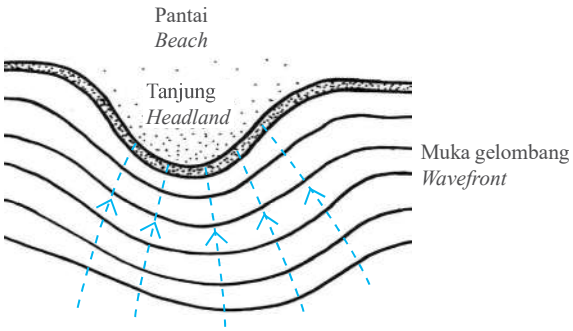
Bahagian A/*Section* A

Soalan *Questions*			Jawapan *Answers*	Sub markah *Subs marks*	Markah total *Total marks*
1	(a)	(i)	✓ Haba pendam/*Latent heat*	1	
		(ii)	Cecair dan pepejal/*Liquid and solid*	1	
		(iii)	Tenaga kinetik tidak berkurang/sama/malar/tetap/tidak berubah *Kinetic energy not decreased/same/constant/remain/not changed*	1	
	(b)		Tenaga haba dibebaskan/hilang/keluar/dilesapkan *Heat energy released/lost/out/dissipated*	1	4
2	(a)		Frekuensi minimum untuk menghasilkan kesan fotoelektrik *Minimum frequency to produce photoelectric effect*	1	
	(b)		$(6.6 \times 10^{-34})(9 \times 10^{14})$ (Gantian yang betul/*Correct substitution*) 5.94×10^{-19} J (Jawapan dan unit yang betul) (*Correct answer with unit*)	1 1	
	(c)		Keamatan bertambah, bilangan elektron bertambah. *Intensity increases, number of electrons increases.*	2	5
3	(a)	(i)	Daya memusat/*Centripetal force*	1	
		(ii)		1	
		(iii)	 (Arah v tangen pada bulatan) (*Direction of* v *tangent to the circle*)	1	
	(b)		$F = \frac{mv^2}{r}$ $= \frac{(0.2)(10)^2}{1.5}$ = 13.33 N (minimum 2 t.p./*minimum* 2 *d.p.*)	2	
	(c)		Bertambah/*Increases*	1	6
4	(a)	(i)	Suis automatik/*Automatic switch*	1	
		(ii)	$V_1 = \frac{R_1}{R_1 + R_2} \times V$ $1.2 = \frac{R_1}{R_1 + 10\,000} \times 6$ $R_1 = 2.5\ k\Omega$ (Jawapan dan unit yang betul) (*Correct answer with unit*)	3	

Soalan *Questions*			Jawapan *Answers*	Sub markah *Subs marks*	Markah total *Total marks*
		(iii)	$\frac{5 \times 10^{-3}}{50 \times 10^{-6}} = 100$ (Gantian yang betul/*Correct substitution*) (Jawapan yang betul/*Correct answer*)	 1 1	
	(b)		– Rintangan PPC bertambah *Resistance of LDR increased* – Voltan tapak bertambah *Base voltage increased* – Arus tapak, I_b mengalir *Base current, I_b flow* – Transistor diaktifkan *Transistor activated* – Arus pengumpul mengalir *Collector current flow* (Maksimum 3 markah/*Maximum 3 marks*)	3	9
5	(a)		✓ gelombang melintang/*transverse wave*	1	
	(b)	(i)	Kedalaman air di kawasan Y > kawasan X//sebaliknya *The depth of water in region Y > region X//vice versa*	1	
		(ii)	Panjang gelombang di kawasan Y > kawasan X//sebaliknya *The wavelength in region Y > region X//vice versa*	1	
		(iii)	Frekuensi gelombang air di kawasan X dan kawasan Y tidak berubah *The frequency of water wave in region X dan region Y are not change*	1	
	(c)		Semakin bertambah kedalaman air, semakin bertambah panjang gelombang//sebaliknya *The depth of water increases, the wavelength increase//vice versa*	1	
	(d)		Pembiasan/*Refraction*	1	
	(e)	(i)	 (Minimum 2 garis melengkung yang menumpu ke arah tanjung dalam julat garis putus-putus) (*Minimum 2 curved lines converged to the cape in the range of the dashed lines*)	1	
	(ii)		$\frac{v_1}{\lambda_1} = \frac{v_2}{\lambda_2}$ $v_2 = \frac{(20)(2.5)}{8}$ $= 6.25 \text{ m s}^{-1}$	2	9
6	(a)		Peraturan Tangan Kiri Fleming *Fleming's Left Hand Rule*	1	
	(b)	(i)	Ketebalan dawai kuprum 6.1(b) > 6.1(a)//sebaliknya *The thickness of the copper wire 6.1(b) > 6.1(a)//vice versa*	1	

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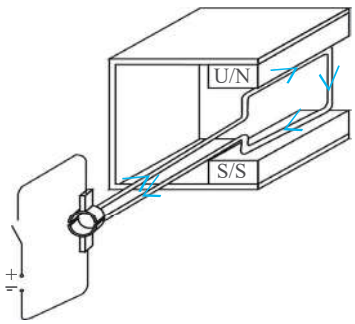
Soalan *Questions*			Jawapan *Answers*	Sub markah *Subs marks*	Markah total *Total marks*
		(ii)	Saiz sudut ayunan dawai kuprum 6.1(b) > 6.1(a)//sebaliknya *The size of swing angle of the copper wire* 6.1(b) > 6.1(a)*//vice versa*	1	
		(iii)	Daya yang bertindak ke atas dawai kuprum 6.1(b) > 6.1 (a)//sebaliknya *The force that acted on the copper wire* 6.1(b) > 6.1(a)*//vice versa*	1	
	(c)	(i)	Semakin bertambah ketebalan dawai kuprum, semakin bertambah daya yang bertindak ke atas dawai kuprum//sebaliknya *The thickness of the copper wire increases, the force acted on the copper wire increases//vice versa*	1	
		(ii)	Semakin bertambah saiz sudut ayunan dawai kuprum, semakin bertambah daya yang bertindak ke atas dawai kuprum//sebaliknya *The size of swing angle of copper wire increases, the force acted on the copper wire increases//vice versa*	1	
	(d)		Arah bertentangan/berlawanan/songsang/ke kiri/ke dalam *Opposite direction/to the left/inwards*	1	
	(e)	(i)	 Arah arus betul pada mana-mana bahagian pada gegelung *Direction of current correct at any parts on the coil*	1	
	(ii)		Lawan arah jam/*Anti-clockwise direction*	1	9
7	(a)		Nukleus berat pecah kepada dua nukleus yang lebih ringan yang sama jisim//berjisim kecil. *Heavy nucleus split into two nucleus of equal mass//lighter mass.*	1	
	(b)	(i)	$0.198264 \times (1.66 \times 10^{-27})$ $= 3.291 \times 10^{-28}$ kg	1	
		(ii)	$E = mc^2$ $= (3.291 \times 10^{-28})(3 \times 10^{8})^2$ $= 2.961 \times 10^{-11}$ J (Gantian yang betul/*Correct substitution*) (Jawapan dan unit yang betul/*Correct answer with unit*)	1 1	
	(c)	(i)	**Boron/*Boron*:** • Kawal kadar tindak balas//Kawal kadar pembelahan nukleus//Serap neutron berlebihan *Control rate of reaction//Control rate of nucleus fission//Absorb excessive neutrons*	2	
		(ii)	**Grafit/*Graphite*:** • Perlahankan neutron//Kawal halaju neutron//Kawal tenaga kinetik neutron *Slow down neutron//Control velocity of neutron//Control kinetic energy of neutron*	2	
	(d)		K	1	9
8	(a)		Pantulan dalam penuh/*Total internal reflection*	1	

Soalan *Questions*			Jawapan *Answers*	Sub markah *Subs marks*	Markah total *Total marks*
	(b)		$n = \frac{1}{\sin c}$ $1.5 = \frac{1}{\sin c}$ $c = 41.81^{o}$ (min. 2 t.p./*min. 2 d.p.*)	2	
	(c)	(i)	Kecil//Rendah. Lebih banyak pantulan dalam penuh berlaku. *Small//Low. More total internal reflection occurs.*	2	
		(ii)	Tinggi//Tumpat. Indeks biasan tinggi//Sudut genting kecil//Lebih banyak pantulan dalam penuh berlaku. *High//Denser. High refractive index//Small critical angle//More total internal reflection occurs.*	2	
		(iii)	Rata//Licin. Lebih banyak pantulan dalam penuh berlaku. *Even//Smooth. More total internal reflection occurs.*	2	9

Bahagian B/*Section* B

Soalan *Questions*			Jawapan *Answers*	Sub markah *Subs marks*	Markah total *Total marks*
9	(a)		Daya graviti/*Gravitational force*	1	
	(b)		$\frac{\sin 60^{o}}{15} = \frac{\sin 60^{o}}{T}$ $T = 15$ N **atau/*or*** $W^2 = T^2 + T^2 - 2(T \times T \text{ kos/cos } 60^{o})$ $W^2 = 2T^2 - 2T^2 \text{ kos/cos } 60^{o}$ $15^2 = 2T^2 - T^2$ $T^2 = 15^2$ $T = 15$ N	4	
	(c)	(i)	$s = ut + \frac{1}{2}gt^2$ $4 = 0 + \frac{1}{2}(9.81)t^2$ $t = 0.903$ s (Gantian yang betul/*Correct substitution*) (Jawapan dan unit betul, min 2 t.p.) (*Correct answer with unit, min. 2 d.p.*)	1 1	
		(ii)	$v = u + gt$ $= 0 + (9.81)(0.903)$ $= 8.86 \text{ m s}^{-1}$ **atau/*or*** $v^2 = u^2 + 2gh$ $= 0 + 2(9.81)(4)$ $v = 8.86 \text{ m s}^{-1}$ **atau/*or***		

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<table>
<tr><th colspan="3">Soalan
Questions</th><th>Jawapan
Answers</th><th>Sub markah
Subs marks</th><th>Markah total
Total marks</th></tr>
<tr><td></td><td></td><td></td><td>$s = \frac{1}{2}(u + v)t$
$4 = \frac{1}{2}(0 + v)(0.903)$
$v = 8.86 \text{ m s}^{-1}$
atau/or
$mgh = \frac{1}{2} mv^2$
$v = \sqrt{2gh}$
$= \sqrt{2 \times 9.81 \times 4}$
$= 8.86 \text{ m s}^{-1}$</td><td>2</td><td rowspan="3">20</td></tr>
<tr><td></td><td>(iii)</td><td>Daya impuls besar//Kadar perubahan momentum tinggi//Masa hentaman pendek
Greater impulsive force//High rate of change of momentum//Shorter time of impact</td><td>1</td></tr>
<tr><td></td><td>(d)</td><td><table>
<tr><th>Ciri-ciri
Characteristics</th><th>Sebab
Reason</th></tr>
<tr><td>Sudut, θ kecil
Small angle, θ</td><td>Daya tinggi
High force</td></tr>
<tr><td>Kabel tidak kenyal
Inelastic cable</td><td>Daya seragam//Panjang kabel tetap//Kabel tidak menegang
Uniform force//Length of cable remain//Cable not stretched</td></tr>
<tr><td>Tegangan maksimum tinggi
High maximum tension</td><td>Menampung daya tinggi//Tidak putus//Tahan lasak//Kuat
Support high force//Not snap //Durable//Strong</td></tr>
<tr><td>Papan kayu
Wooden plank</td><td>Kurang tekanan//Tambah luas permukaan/ sentuhan.
Less pressure//Increase surface/contact area</td></tr>
<tr><td colspan="2">Pilih S kerana sudut, θ kecil, kabel tidak kenyal, tegangan maksimum tinggi dan papan kayu.
Choose S because small angle, θ, inelastic cable, high maximum tension and wooden plank.</td></tr>
</table></td><td>2
2
2
2
2</td></tr>
<tr><td>10</td><td>(a)</td><td></td><td>Kadar pengaliran cas/Rate of flow of charge</td><td>1</td><td rowspan="4"></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>$P = \frac{V^2}{R}$
$1\,000 = \frac{240^2}{R}$
$R = 57.6 \text{ ohm} // \Omega$</td><td>3</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>$P = I^2 R$
$= 4.2^2 \times 57.6$
$= 1\,016.064 \text{ W}$ (min. 2 t.p./min at 2 d.p.)</td><td>2</td></tr>
<tr><td></td><td>(c)</td><td></td><td>– Tenaga elektrik ditukarkan kepada tenaga haba.
Electrical energy converted into heat energy.
– Elemen pemanas berbentuk gegelung.
Coiled shaped heating element.</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Soalan
Questions</th><th>Jawapan
Answers</th><th>Sub markah
Subs marks</th><th>Markah total
Total marks</th></tr>
<tr><td></td><td></td><td></td><td>– Panjang elemen pemanas bertambah, rintangan bertambah.
Length of heating element increases, resistance increases.
– Rintangan hasilkan haba.
Resistance produced heat.
– Haba yang tinggi dihasilkan.
A lot of heat produced.
– Haba dipindahkan ke periuk//Periuk serap haba dari elemen pemanas.
Heat is transferred to the pot//Pot absorbed heat from the heating element.
(Max. 4m)</td><td>4</td><td rowspan="2">20</td></tr>
<tr><td></td><td>(d)</td><td></td><td>
<table>
<tr><th>Cadangan
Suggestions</th><th>Sebab
Reason</th></tr>
<tr><td>Bentuk dawai perintang – Bergelung
Shape of resistance wire – Coiled</td><td>Rintangan tinggi//Panjang// Banyak haba
Higher resistance//Long//More heat</td></tr>
<tr><td>Kerintangan dawai perintang – Tinggi
Resistivity of resistance wire – High</td><td>Lebih haba//Rintangan tinggi
More heat//High resistance</td></tr>
<tr><td>Bahan dawai perintang – Nikrom
Material of resistance wire – Nichrome</td><td>Takat lebur tinggi//Rintangan tinggi//Banyak haba
High melting point//High resistance// More heat</td></tr>
<tr><td>Bahan salutan luar – Keluli
Casing material – Steel</td><td>Tidak teroksida//Tahan suhu tinggi//Konduktor haba yang baik
Not oxidise//Withstand high temperature//Good heat conductor</td></tr>
<tr><td colspan="2">Pilih model L kerana dawai perintang bergelung, kerintangan dawai perintang tinggi, bahan dawai perintang ialah nikrom dan bahan salutan luar ialah keluli.
Choose model L because coiled resistance wire, high resistivity of resistance wire, material of resistance wire is nichrome and casing material is steel.</td></tr>
</table>
</td><td>2
2
2
2
2</td></tr>
</table>

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Bahagian C/*Section* C

Soalan *Questions*			Jawapan *Answers*	Sub markah *Subs marks*	Markah total *Total marks*
11	(a)		Laju bendalir yang mengalir bertambah, tekanan berkurang *Speed of a moving fluid increases, pressure decreases*	1	
	(b)		– Laju air di atas bertambah. *Speed of water above increases.* – Tekanan di bawah bertambah//sebaliknya. *The pressure of water below increases.* – Perbezaan tekanan. *Pressure difference.* – Daya angkat terhasil. *Lift force produced.* – Daya angkat > berat//daya paduan ke atas *Lift force/Lift > weight//resultant force upwards* (Max. 4m)	4	
	(c)		– Ketinggian papan luncur dari permukaan air pada Rajah 11.3 lebih tinggi//sebaliknya *High of the surfboard from the water supply in Diagram* 11.3 *is higher//vice versa*	1	
			– Daya geseran air yang bertindak ke atas papan luncur pada Rajah 11.3 lebih rendah//sebaliknya *Water friction acted on the surfboard in Diagram* 11.3 *is lower//vice versa*	1	
			– Laju papan luncur pada Rajah 11.3 lebih tinggi//sebaliknya *Speed of surfboard in Diagram* 11.3 *is higher//vice versa*	1	
			– Ketinggian bertambah, daya geseran berkurang//sebaliknya *Height of surface increases, frictional force decreases//vice versa*	1	
			– Daya geseran berkurang, laju papan luncur bertambah *Water friction decreases, speed of the surface increases*	1	

(d)

Cadangan *Suggestions*	Sebab *Reason*
Ciri-ciri bot/*Characteristic of boat*	
– Ketumpatan bot rendah *Low density of boat*	Ringan//Jisim rendah *Light//Low mass*
– Bot kuat/kukuh/aluminium/keluli *Strong boat/Aluminium boat/Steel boat*	Tidak pecah//Tidak bocor//Kuat//Kukuh//Tahan lasak *Not break//Not leak//Strong//Durable*
– Jisim bot kecil//Bot ringan *Mass of boat small//Boat lighter*	Bot pecut *Boat accelerates*
– Bot aerodinamik *Aerodynamic boat*	Kurang geseran/rintangan/seretan *Less friction/resistance/drag*
Saiz bot/*Size of boat*	
– Besar//Panjang//Luas//Lebar *Big//Long//Wide*	Terapung//Daya apungan besar//Banyak air tersesar *Float//Greater buoyant force//Displaced more water*
Ciri-ciri hidrofoil ***Characteristic of hydrofoil***	
– Ketumpatan hidrofoil rendah *Low density of hydrofoil*	Jisim rendah//Pecut *Low mass//Accelerates*
– Jisim hidrofoil kecil//Hidrofoil ringan *Mass of hydrofoil small//Hydrofoil light*	Pecut *Accelerates*
– Hidrofoil kuat/kukuh/aluminium/keluli/plastik fiber *Strong hydrofoil/Aluminium hydrofoil/Steel hydrofoil/fibre plastic hydrofoil*	Tidak pecah//Kuat//Kukuh//Tahan/Tidak karat *Not break//Strong//Durable//Not rust*
Bilangan hydrofoil ***Number of hydrofoil***	
– Hidrofoil banyak/lebih daripada 2 *Many hydrofoil/More than* 2	Daya lebih//Kuasa lebih//Tenaga lebih//Momentum lebih//Daya apungan besar *More force//More power//More energy//More momentum//Great buoyant force*
Kuasa enjin yang digunakan ***Power of the engine used***	
– Besar//Tinggi/Berkuasa tinggi *Large//High*	Daya besar/tinggi//Lebih daya//Momentum/Tenaga tinggi//Daya apungan besar *Big/High force//More force//High momentum/energy//Great buoyant force*

Maks. 10 markah daripada mana-mana bahagian.
Max. 10 *marks from any parts.*

10 | 20

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