

2SE 2019
Secondary 1 Express Science
Marking Scheme

Section A [30 marks]

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
A	D	C	A	B	A	B	A	B	D
A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
B	B	C	C	D	B	A	A	C	A
A21	A22	A23	A24	A25	A26	A27	A28	A29	A30
B	B	C	A	A	A	A	A	C	C

Section B [30 marks]

B1			
(a)	the material of rulers	1	
(b)	the flexibility of the rulers / how much the rulers bend	1	
(c)	The <u>length of the rulers</u> are <u>not identical</u>	1	
(d)	- the amount of weights - the tightness of the clamps - the type of rope that connected the ruler to weights - point the weight is hung	Any 2, 1m each	Accept any other reasonable answer Reject: Height of table, length of rope,

B2				
(a)	root hair cell	1		
(b)	P: vacuole Q: nucleus	2		Accept <i>large central vacuole</i>
(c)	The cell in Fig. B2.1 has a <u>cell wall</u> whereas an animal cell <u>does not have a cell wall.</u>	1		Only large central vacuole is allowed (size, position)
	The cell in Fig. B2.1 has a <u>long and narrow protrusion</u> whereas an animal cell <u>does not have any protrusions.</u>	1		
	The cell in Fig. B2.1 has a <u>large central vacuole</u> whereas a typical animal cell has <u>many small vacuoles.</u>	1		
B3				
(a)	Osmosis	1		No marks if spelling is wrong
	It is the (net) movement of water (molecules) from a (region of) <u>higher water potential to a (region of) lower water potential</u> through a <u>partially permeable membrane.</u>	1		
(b)(i)	C			
(b)(ii)	B			
(c)	<u>A has a higher water potential compared to the sugar solution.</u>	1		Accept vice versa Accept if the student missed out osmosis, given that part (a) was osmosis.
	Thus, <u>water molecules move out of A via (osmosis),</u> making it shrink in mass.	1		
B4				
(a)	Rubber/Fabric/Cloth/Wool	1		Accept good insulator Reject wood/ceramic Reject <i>bad conductor</i>
(b)	It is a <u>poor conductor of electricity.</u>	1		Accept names of metals/alloys which are hard (e.g Iron, Steel) Accept description of property Reject <i>durable</i>
	Metal / Ceramic	1		
	It is <u>strong/hard.</u>	1		

B5			
(a)	0.1 kg	1	
(b)	$0.1 \times 1.6 = 0.16 \text{ N}$	1	
(c)	$0.05 \times 10 = 0.5 \text{ N}$	1	Working needed to get full marks.
	<u>Yes</u> it will be able to lift up the rock samples on the moon	1	No marks awarded for only Yes/No
B6			
(a)	$24 - 8 = 16 \text{ V}$	1	
(b)(i)	$4 + 4 = 8 \Omega$	1	
(b)(ii)	$6 + 6 = 12 \Omega$	1	
(b)(iii)	$1/R = 1/8 + 1/12$ $= 5/24 \text{ or } 0.2083$		Allow E.C.F
	$R = (5/24)^{-1} = 4.8 \Omega$	1	
(c)	$16 / 8 = 2 \text{ A}$ $16 / 12 = 1.33 \text{ A}$	1	Allow E.C.F
	Total current = $2 + 1.33 = 3.33 \text{ A}$	1	

Section C [40 marks]

C1				
(a)(i)	transfer of heat / thermal energy through <u>contact</u> between objects	1		
(a)(ii)	The <u>higher</u> the <u>thermal conductivity</u> of metal, the <u>shorter</u> the <u>duration/time taken</u> for the cork to drop	1		Accept vice versa Accept any other wording related to shorter duration Reject <i>slower</i> duration
(a)(iii)	<u>Higher thermal conductivity</u> allows heat to be <u>more easily/faster/quickly transferred</u> from the heater to the wax.	1		
(b)(i)	Heat is transferred from the hot plate to the iron saucepan to water by <u>conduction</u> .	1		
	<u>Convection currents</u> [1] of water are set up as the <u>water is heated up, expands (increase in volume) becomes less dense and rises</u> and the <u>colder water sinks</u> [1].	2		
(b)(ii)	Shiny surfaces are <u>poor radiators/emitters of heat</u> , thus heat lost through radiation is reduced.	1		Accept lose heat slowly/Accept reflect heat
(b)(iii)	Rubber/wood/ceramic	1		
(c)	The <u>tiles have expanded</u> and there was not enough space in between the tiles, causing them to pop up.	1		Accept space increase Accept any other reasonable answers Reject <i>burst</i>
	Leave more <u>gap</u> in between the tiles / Use a <u>rubber grouting</u>	1		
C2				
(a)(i)	Box Y	1		
(a)(ii)	There was <u>force applied</u> [1] on the box and the <u>box moved in the direction of the force applied</u> [1].	2		
(a)(iii)	400 cm = 4.0m 30 x 4 = <u>120 Nm</u> or <u>120 J</u>	1 1		
(b)(i)	Frictional Force / Friction	1		

(b)(ii)		1	Accept any indication on direction of friction
(c)(i)	10 x 10 = 100N	1	
(c)(ii)	20 cm = 0.2m Area = 0.2 x 0.2 = 0.04 m ² Pressure = 100 / 0.04 = <u>2500 N/m²</u> or <u>2500 Pa</u> or <u>2.5 kPa</u>	1	ECF max 1m
C3			
(a)(i)	<u>Transport oxygen</u> from the <u>lungs to all parts of the body</u> .	1	
(a)(ii)	The sickle-cell is <u>smaller in size</u> . Thus, it would <u>contain lesser haemoglobin</u> . <u>Lesser oxygen will be transported</u> .	1 1 1	Accept is student talk about SA:VR, making it inefficient in oxygen exchange. SA – 1 , rate – 1 , amount – 1
(a)(iii)	It has <u>no nucleus [1]</u> to <u>pack more haemoglobin [1]</u> for faster transport of oxygen.	2	
(b)(i)	Phloem	1	
(b)(ii)	<u>Transport food substances</u> from the <u>leaves to all part of the plant</u> .	1	
(b)(iii)	Plants <u>photosynthesize during the day</u> . There will be <u>more food in the phloem</u> during the day.	2	
C4			
(a)(i)	Energy <u>cannot be created or destroyed</u> . It can only be <u>converted from one form to another</u> .	1 1	
(a)(ii)	<u>No</u> , it will not. Energy is <u>lost as heat/sound</u> during the process.	1 1	

(a)(iii)	Maximum kinetic energy at <u>3</u> Amount of kinetic energy and potential energy is equal is at <u>2</u> .	1	
(b)(i)	A source of energy that can be <u>used indefinitely</u> or <u>sustained for a very long time</u> .	1	
(b)(ii)	<u>Carbon dioxide is produced</u> when biofuel is burnt. It still <u>contributes to global warming/climate change/greenhouse gas</u> .	1 1	
(b)(iii)	Solar energy	1	
C5			
(a)(i)	- a battery - two lamps connected in series - an ammeter that measures the current passing through both lamps - a fixed resistor that is connected in parallel to the two lamps - a voltmeter that measures the voltage across the fixed resistor - a switch that is capable of turning off the two lamps	6c – 4 5c- 3 3-4c-2 1-2c-1 0c-0	Accept dry cell as battery
(b)(i)	circuit breaker	1	
(b)(ii)	fuse	1	
(b)(iii)	$3.5 \times 12 = 42$ $42 \times 0.25 = \$10.50$	1 1	
(b)(iv)	The switch is in a <u>damp condition[1]</u> and can cause <u>electric shock[1]</u> to the people switching it on.	2	

