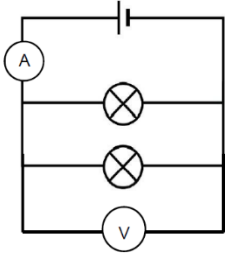


KUO CHUAN PRESBYTERIAN SECONDARY SCHOOL
END OF YEAR EXAM
SECONDARY TWO EXPRESS
LOWER SECONDARY SCIENCE 2022
MARK SCHEME

Section A: Multiple-Choice Questions (30 marks)

1	2	3	4	5	6	7	8	9	10
B	B	D	B	D	B	A	D	C	C
11	12	13	14	15	16	17	18	19	20
A	A	B	B	B	C	D	B	D	C
21	22	23	24	25	26	27	28	29	30
B	D	C	B	C	D	B	A	C	B

Section B: Structured Questions (40 marks)

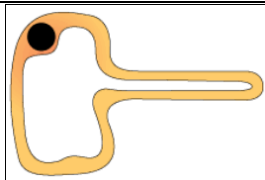
1	(a)	 [1] each: • A power source connected to • two bulbs in parallel. • One ammeter reading the total current in the circuit. • One voltmeter reading the potential difference of one bulb.	4
	(b)	Add a switch between dry cell and first light bulb.	1
	(c)	Total resistance increases.	1
	(d)	Include a rheostat/variable resistor in the circuit	1
			[Total:7]

2	(a)	[1] for each set of correct observations for each set of tests:		2
			test with iodine	
		Visking tubing contents	Mixture turns blue-black	
		water in boiling tube	Mixture turns brown.	
	(b)	[1] for each point: • Amylase is destroyed by the heat from the hot water, • so cannot digest starch. • Starch remains present in the Visking tubing, and simple sugars are not produced. • Starch molecules are too big to diffuse out of the Visking tubing.		4
	(c)	(i)	Small intestine	1
		(ii)	absorption	1
				[Total:8]

3	(a)	Larger area in contact with roof		1
		Lower pressure		1
	(b)	(i)	Total mass = 40 +160 = 200kg Total weight = m x g = 200 kg x 10N/kg = 2000 N	1
		(ii)	$P = F/A$ $= 2000/0.8$ $= 2500 \text{ Pa}$	1
				[Total:5]

4	(a)	As the gaseous molecules within the bottle <u>gained energy</u> from the surrounding, Molecular <u>vibrations</u> / <u>kinetic energy</u> increased, Causing expansion as the space between the particles increased.	1 1 1
	(b)	Remained unchanged.	1
	(c)	mass remained unchanged as there is no increase in the number of particles.	1
			[Total:5]

5	(a)	2.4, 2.6, 2.6, 2.6, 2.6	1
	(b)	copper carbonate + hydrochloric acid → copper chloride + carbon dioxide + water	1
	(c)	Carbon dioxide gas produced escapes from the flask through the cotton wool, so the mass of contents in the flask decreases.	1
	(d)	4th min.	1
		[Total:4]	

6	(a)	(i)	sample of onion tissue	Diagram A, B or C	1
			freshly peeled from onions	B	
			placed in water	A	
			placed in concentrated sugar solution	C	
		(ii)	Cell sap had <u>less water molecules</u> than the medium where it was placed; Water entered the cell by <u>osmosis through the partially permeable membrane</u> ; Contents of cytoplasm swelled and press against the cell wall		1 1
	(b)				1
		Root hair cell			1
	(c)	The <u>elongated shape of the root hair cell</u> <u>increases the surface area</u> of the cell which increases the rate of absorption;			1
					[Total:6]

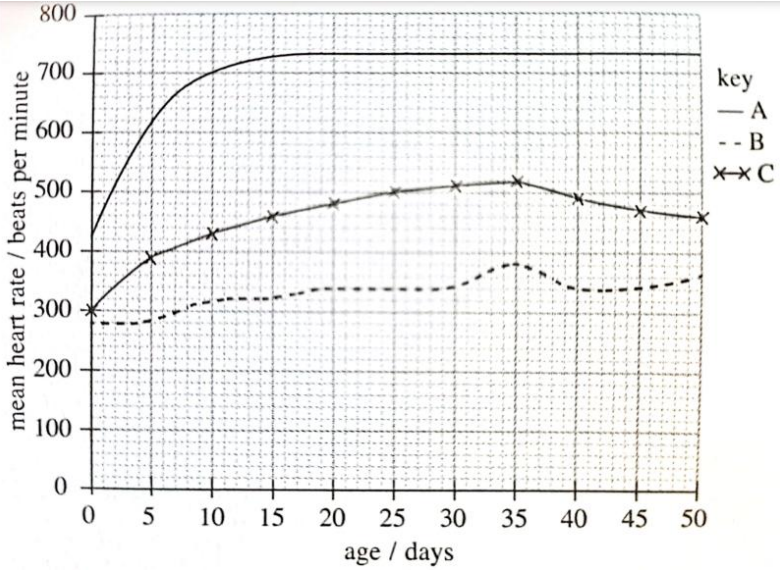
7	(a)	(i)	Xylem and phloem		2
		(ii)	[1] each:		2
			xylem	phloem	
			Transports water and dissolved minerals.	Transports sugars/manufactured food made in the leaves.	
			Transports water from roots to all parts of the plant in an upward direction.	Transports sugars in both upward and downward directions from the leaves to all parts of the plant.	
	(b)		Carry manufactured food made in the leaves to the banana fruit.		1
			[Total:5]		

Section C: Free Response Questions (4 choose 3; 30 marks)

8	(a)	(i)	$R = V/I$ $= 6/2 = 3 \Omega$ Reject: If working shows $V = 12 - 6 = 6V$ then followed by above working (do not need to subtract p.d. across parallel circuit)	1
		(ii)	$V = 12 - 6 = 6 V$ Reject: If no working shown or using current (3A) x the combined resistance of the fan and bulb	1
		(iii)	$R = V/I$ $= 6/ (2+1)$ $= 2 \Omega$ <u>Note:</u> allow for e.c.f. where V is from (ii)	1
	(b)	(i)	$X = 8 \times 2 = 16 \text{ kWh}$ $Y = 0.225 / 0.15 = 1.5 \text{ h}$ $Z = 0.375 / 1.5 \times 1000 = 250 \text{ W}$ Reject: fractions	3
		(ii)	Cost of electricity = $(16 + 0.225 + 0.375) \times 7 \times \0.30 $= \$34.86$ <u>Note:</u> allow for e.c.f. where energy from X is used in (i)	2
		(iii)	1. It serves to protect the equipment from a surge of current by melting and breaking / opening the circuit 2. when the current that passes through it exceeds the fuse rating .	2
				[Total:10]

9	(a)	<u>Amylase</u> digesting <u>starch</u> into <u>maltose</u> . (minus 1m for each mistake)		2
	(b)	(i)	A – oesophagus / gullet B - stomach C - small intestine D - large intestine (2 correct = 1m)	2
		(ii)	protein	1
		(iii)	Protein not completely digested in the stomach. / Protein digested into simpler protein Further <u>release of proteases</u> into small intestine will complete the digestion of protein / simpler protein further digested into amino acids.	1

		(iv) Any <u>undigested proteins/ cannot be absorbed once</u> peristalsis propels the content past the small intestine. Hence small levels of protein are present in the rectum.	1
	(c)	Secrete bile to which emulsifies large fat droplets to smaller fat droplets. This increases the surface area for enzymes to act on.	1 1
			[Total:10]

10	(a)	(i)	 mean heart rate / beats per minute age / days key — A -- B x x C All points accurately plotted [1] Smooth line joining all points [1]	2
		(ii)	390 beats per minute	1
		(iii)	Any 2: • Mean heart rate of Group C rats is higher than that of Group B rats. [1] • There is a higher increase in the mean heart rate of Group C rats (from 300 bpm on Day 0 to 520 bpm on Day 35) than that of Group B rats (from 280 bpm on day 0 to 380 bpm on day 35). [1] • After day 35, the heart rate for group C decreased (from 520 bpm to 460 bpm) while that of group B decreased from 380 bpm to 340 bpm at day 40 then increased to 370 bpm at day 40). [1] [1] for quoting values from graph.	3
	(b)	(i)	1. Oxygen diffuses from within the leaf, where it is of a higher concentration, to outside the leaf, where it is of a lower concentration.	2

