



Mark Scheme (Results)

Summer 2013

NQF BTEC Level 1/Level 2 Firsts in
Applied Science

Unit 1: Principles of Science (20460E)

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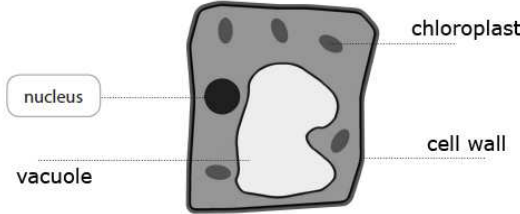
Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (a) (i)	infrared- television remote controls (1) x-rays- seeing internal structure of the body (1)		More than one line from each box on left hand side of paper	2
(ii)	Sterilising food/ Sterilising Medical equipment/ Detection of cancer/ Treatment of cancer	Gamma camera kill cancer (cells) /radiotherapy	Detect illness Cause cancer Nuclear power	1
1(b)	Ultra Violet light can cause damage to (surface) cells/ eyes	lead to cancer damage (surface) cells/eyes burns skin/sunburn blindness Cataracts Cell mutation ignore damage inside the body		1
1(c)	A - Hertz		More than one cross	1
				5 marks

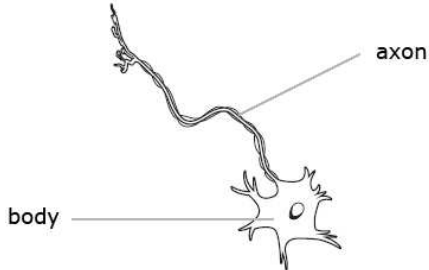
Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2(a)i	C - Mechanical			1
2(a)ii	convection	Any reasonable description of convection Hot air rises		1
2(b)i	heat	Thermal		1
2(b)ii	(Total energy supplied x efficiency) / 100 (1) 48 (1)	Correct substitution (120 x 40)/100 = Or 40 = (use/120) x 100(1) Allow 40 x 120 for 1 mark Or Allow 48 to any power of 10 for 1 mark e.g 4.8, 480, 4800 Correct answer with no working (2) Ignore units		2
				5 marks

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3(a)i	D- 2000			1
3(a)ii	Sound	Accept Kinetic/KE/ movement Light Ignore wind energy		1
3(b)i	Convert minutes to seconds 300s (1) 225000(J)(1)	750 x300 (1) 225kJ (1) Correct answer with no working (2) 225000 to any power of 10 eg 2.25 (1) If no other marking point given then 750 x 5 (1) or 3750 (1) or 5 x 60 (1) Ignore units		2
3bii	Convert watts to kilo watts (0.75kW) (1) 4x0.5 (= 2hrs) (1) Correct substitution 0.75 x2 =(1.5) (1) 45p / 1.5= 30p (1)	750/1000 (1) Allow 30 x4 (1) or 120 (1) Or 2 hours 1.5kWh or 750 x 2 (1) £0.30 Allow ecf from earlier steps Correct answer with no working (4) 0.30 to any power of 10 (3) Must be on answer line Ignore units		4
				8 marks

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4(a)i	B – aluminium and potassium			1
ii	Cl	Ignore 2 eg Cl ₂ , 2Cl	CL, cl, cL, ch, CH, Ch, cH	1
iii	It is on the right hand side (1) (of the periodic table)	<p>It is on the right hand side of the steps/zigzag/staircase on the periodic table.</p> <p>Metals are on the left hand side of the steps/zigzag/staircase on the periodic table.</p> <p>All group 7 elements are non-metals.</p> <p>Ignore in non metal section.</p>	It is in Group 7.	1
4(b)	<p>Top - proton (1)</p> <p>Middle - electron (1)</p> <p>Bottom - neutron (1)</p>	Accept phonetic spelling	Nucleus	3
				6 marks

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
5(a)	Corrosive			1
5(b)i	A - 1			1
5(b)ii	Alkali	Base/alkaline/basic		1
5(b)iii	Neutralisation	Neutralising		1
5(b)iv	Hydrochloric acid + sodium hydroxide (1) Sodium chloride + water (1)	Phonetic spellings		2
				6 marks

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
7 (a)	 <p>Accept (cell) membrane for (cell) wall</p> <p>Accept phonetic spelling</p>		Mitochondria	3
(b)	Controls (activities of) cell	(Contains) DNA/Chromosomes/genetic material/genes	Brain of cell	1
				4 marks

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
8(a)i	D - increasing heart rate when running			1
ii	Nervous system	Central nervous system, peripheral nervous system CNS PNS Ignore brain/nerves alone		1
8(b)i	 <p>The axon is the long darker section in the diagram</p>		Ignore other labels	1
8(b)ii			Ignore other labels Reject multiple lines	1

8(c)	<p>Any 4 from</p> <p>Insulin: These 3 marking points must be linked to lowering glucose/high glucose</p> <ul style="list-style-type: none"> • <u>Insulin</u> released by pancreas (1) • Converts <u>glucose</u> to <u>glycogen</u> (1) so that it can be • Stored in liver (1) <p>Glucagon: These 3 marking points must be linked to raising glucose/low glucose</p> <ul style="list-style-type: none"> • <u>Glucagon</u> released by pancreas (1) • Converts <u>glycogen</u> to <u>glucose</u> (1) so that it can • Enter the bloodstream/released from liver (1) 	4
		8 marks

Question Number	Indicative content	
9	<p>Shivering- raises temperature, involuntary contraction of muscles produces heat</p> <p>Raising body hair – prevents heat loss, prevents air currents getting near skin surface</p> <p>Vasoconstriction – decreases heat loss by radiation, blood capillaries near skin get narrower (constrict) so less blood near skin</p> <p>Sweating- lowers temperature, sweat evaporates, cooling skin</p> <p>Lowering body hair- lowers temperature, allows air currents near skin surface, allows loss of heat by convection</p> <p>Vasodilation - increases heat loss by radiation, blood capillaries near skin get wider (dilate) so more blood near skin</p>	
Level	Mark	Descriptor
	0	No rewardable material
Pass	1-2	A few key points identified, or one point described in some detail. The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/ directly linked to the situation in question. Examples of method(s) of controlling temperature given. Little attempt to explain how the methods work (e.g. hair lies down and you shiver when you are cold; or when hot you sweat so you lose heat by evaporation)
Merit	3-4	Some points described, or a few key points explained. The answer is unbalanced. Most points made will be relevant to the situation in question, but the link will not always be clear. Some attempt to explain how methods work. Maybe some inaccurate science. (e.g. When hot, blood vessels get wider so heat is lost through skin and and you also sweat; or when you are cold you will shiver, your hairs stand up and your capillaries get thinner)
Distinction	5-6	A detailed explanation is given as to how the system works. The majority of points made will be relevant and there will be some clear link to the situation in question. (e,g, when you are hot you will sweat, your hairs will lie flat and there is vasodilatation which means more heat is radiated. When you are cold you shiver; or When you are cold you will shiver, your hairs will stand on end to trap air and you will have less blood near your skin. When you are hot you will sweat.)

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