OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



MARK SCHEME

B2.5 HOW CAN LIFESTYLE, GENES AND THE ENVIRONMENT AFFECT HEALTH? (FOUNDATION)

SCORE	PERCENTAGE
/68	%

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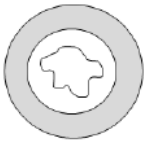
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Question			Answer/Indicative content	Marks	Guidance
1	a		Risk of death increases with age ✓ Risk is always greater in males ✓	2	
	b	i	Content added to inside of blood vessel ✓ Artery wall of same thickness ✓	2	 **ALLOW** 1 mark for a narrowed lumen with no indication of artery wall thickness
		ii	Positive ✓	1	
		iii	Is an individual case ✓ Would need a lot of results to see a pattern or trend ✓	2	
			Total	7	
2	a	i	Less than / before 30; (age) when stopped smoking	2	**Do not accept** 30 (and under) **Examiner's Comments** Mathematical skills were disappointing. Many candidates mistakenly interpreted <30 as 30 or less and also failed to add 'when stopped smoking'.
		ii	11 ? 5.6; 5.4	2 2	5.4 alone = 2 marks **Examiner's Comments** Very few candidates were able to correctly calculate the increase in percentage of fat, most mistakes were due to incorrect reading of the scale.
		iii	*Any* **younger** you are when you **stop** the lower the risk / the **older** you are when you **stop** the higher the risk; Even if never smoked still have a risk / low(est) risk; **Rate** of increase of risk increases with age / doubles every ten years		**accept** positive correlation between age and risk for 1 mark **Examiner's Comments** Most candidates were able to state one correct conclusion relating to non-smokers still having a risk of developing cancer.

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Question			Answer/Indicative content	Marks	Guidance
		iv	(As) **how long** they have smoked….; ……increases, risk increases:	2	**accept** idea that it is uncertain how long they have been smoking. Trend must be identified for 2nd mark e.g. Longer you smoke the bigger the risk ORA = 2 marks **Examiner's Comments** Once again many candidates were able to recognise that number of years smoking was important in coming to a conclusion.
	b		**Food / intake idea** eg Poor diet explained eg fat clogs arteries; **Exercise idea** eg Lack of exercise explained eg unfit ORA	2	**accept** recreational / illegal drugs and alcohol for Food idea **accept** any good explanation e.g. fat clogs arteries / salt raises blood pressure **Examiner's Comments** Most candidates exhibited good knowledge of the effects of unhealthy lifestyle choices.
			Total	**10**	

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Question			Answer/Indicative content	Marks	Guidance
3			[Level 3] Answer includes some indicative scientific points concerning BOTH group 1 and group 2 AND refers to difficulties regarding overlap of groups. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] Answer includes some indicative scientific points concerning BOTH group 1 and group 2. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] Answer includes some correct indicative points concerning group 1 OR group 2. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	• Some men have a very healthy aorta • Some have an aneurism that may require surgery. • Reasons for not giving surgery could include ideas of benefits do not outweigh the risk of surgery. • Range in group 1 is 1.0 - 6.5cm References to indicative scientific points concerning group 2 may include: This question is targeted at grades 5 to 6 • Surgery starts at about 4.5cm • Range in group 2 is 4.5 - 8.5cm References to indicative scientific points concerning overlap of both groups may include: • Idea of some men have surgery between 4.5cm and 6.5cm (group 2) others do not (group 1). • All men 6.5cm and above have surgery • Idea that they may have different risk factors e.g. BMI / smokers etc. Use the L1, L2, L3 annotations in RM Assessor; do not use ticks. Examiner's Comments Unfortunately the success of previous extended writing questions did not continue with this question. Candidates found great difficulty interpreting the bar chart and connecting the data together. This resulted with poor scoring across the question.
			Total	6	

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Question			Answer/Indicative content	Marks	Guidance
4			[Level 3] Includes some indicatives points from all three areas. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] Includes some indicative points from two areas. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] Includes some indicative points from one area. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	• BMI = 90 / 2.89 • = 31 • Needs to be 24 or below • Refers to 29% fat Indicative scientific points concerning conclusions • Neil is obese on BMI scale • Neil is above average on fat scale • Idea that BMI is not completely reliable Indicative scientific points for action may include This question is targeted at grades up to C Indicative scientific points referring to the tables may include Yes he should be concerned. • He should lose weight • Do more exercise • Improved diet Use the L1, L2, L3 annotations in RM Assessor; do not use ticks. Examiner's Comments This extended writing question was well answered by the majority of candidates. Many candidates were able to calculate the BMI and interpret the data and go on to formulate conclusions and suggest suitable actions.
			Total	6	

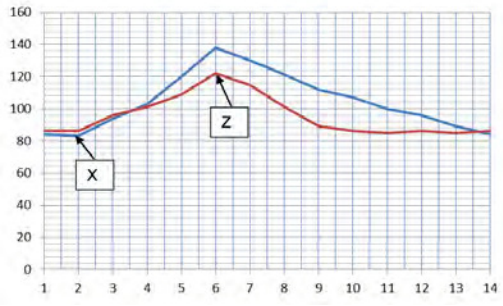
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Question			Answer/Indicative content	Marks	Guidance
5	a		[Level 3] Includes several questions and several reasons for asking them. Quality of written communication does not impede communication of the science at this level. (5–6 marks) [Level 2] Includes some questions and reasons for asking them. Quality of written communication partly impedes communication of the science at this level. (3–4 marks) [Level 1] Includes only question. Quality of written communication impedes communication of the science at this level. (1–2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	• any symptoms • current medication • alcohol consumption • tobacco consumption • level of physical activity • medical history / pregnant / injuries • family medical history • previous treatments • age • gender • BMI / mass / weight Reasons for asking questions may include: • to see if person is well enough to train • to prevent making any medical condition worse • to determine level of fitness • to plan / fitness regime • to avoid harm • to see if any other factors may affect the training plan Use the L1, L2, L3 annotations in Scoris; do not use ticks. Examiner's Comments Candidates were able to identify a number of questions that should be asked by fitness trainers prior to starting an exercise programme but found difficulties explaining their importance. This limited the majority of candidates to level one and two answers.

This question is targeted up to grade E

List of questions may include

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Question			Answer/Indicative content	Marks	Guidance
	b	i		1	Both correct for 1 mark Arrows / lines / labels within half a square **Examiner's Comments** This part was poorly answered with nearly half the candidates unable to interpret the data on the graph.
		ii	4;	1	ecf from b i **Examiner's Comments** The second part of the graph data interpretation question was better answered, error carried forward enabled many of the candidates to access this mark.
		iii	B (does not score) Because it is lower Because it returns to normal quicker	2	"A" scores zero marks **Ignore** 'less time to cool down' **Examiner's Comments** There was some confusion amongst candidates in this part of the question with many wrongly thinking that an improved fitness level would produce a higher heart rate
			Total	**11**	

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Question			Answer/Indicative content	Marks	Guidance
6	a	i	155 95;	1	Both required for the mark Units not required **Examiner's Comments** Candidates answered this part well, the majority being able to accurately interpret the scale on the graph.
		ii	<table><tr><th>low</th><th>ideal</th><th>pre-high</th><th>high</th></tr><tr><td></td><td></td><td></td><td>✓</td></tr></table>	1	**Examiner's Comments** The majority of the candidates correctly interpreted the second chart, however some candidates used the diastolic value.
	b		27 to 35;	1	**Examiner's Comments** The wide range of acceptable days ensured that most candidates could accessthis mark.
	c		Idea of doing different activities / exercise / stress / salt / alcohol / smoking;	1	OWTTE **Ignore** medicine / diet / sugar **Examiner's Comments** There were a wide range of acceptable answers here, however a number of candidates failed to gain the mark by going down the diet route.
	d	i	120 (2); 840 / 7;	2	120 = 2 marks **Examiner's Comments** There was a disappointingly high number of candidates who were unable to calculate a mean.
		ii	Idea of best estimate of true / actual value; OR compare with other data / results / means;	1	**Allow** accurate **value** **Ignore** reference to outliers **Ignore** true **results / accurate results** **Examiner's Comments** The idea that the mean is the best estimate of the true value was known by very few candidates.

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Question			Answer/Indicative content	Marks	Guidance
		iii	115; 125;	1	Accept either way round Units not required **Examiner's Comments** This section was answered well, most candidates able to interpret the data in order to obtain the range.
		iv	*Idea that blood pressure (systolic) is lower* after answer to part b / between day 1 / 155 to day 60 / 115 / between start and end / between first 7 days / 142.7 and last 7 days / 120; Ref to diastolic pressure also dropped at same time;	2	ecf for day medicine taken **Examiner's Comments** This section proved to be quite difficult for a number of candidates as the data on multiple pages needed to be accessed in order to obtain the evidence.
			Total	**10**	

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Question			Answer/Indicative content	Marks	Guidance
7		i	6900	1	mark answer in table as this is what is asked if no answer in the table, mark answer below question **Examiner's Comments** The majority of candidates were able to use the formula given to calculate the cardiac output. Those candidates that did not appear to use a calculator often got an incorrect answer.
		ii	range: 4970 to 6900	1	allow ecf from **bi** **allow** 6900 to 4970 **Examiner's Comments** A surprising number of candidates did not appear to know how to calculate the range for this data. Many answers were expressed with the higher number given first. Candidates should be reminded how to present the range. Examiners were instructed to use an error carried forward from part (i) to ensure candidates were not penalised for the same mistake twice.
		iii	Alistair Ian Colin Byron	1	ignore numbers **Examiner's Comments** This question was generally well answered though some candidates failed to gain the mark due to a reversed order or the presentation of the pulse rates rather than the individuals names.
		iv	Ian has only just joined the running club: the measurements were only recorded once: ✓ a person's pulse rate may vary: ✓ blood pressure measurements were not recorded: the men all had different diets:	2	**Examiner's Comments** The majority of candidates correctly identified one or both reasons as to why the order of fitness presented could be incorrect.
			Total	**5**	

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Question			Answer/Indicative content	Marks	Guidance
8	a		306 (1) (306 x 2) 612 (1) 49 (1)	3	49 alone scores 3 marks **ignore** decimal places **Examiner's Comments** It was pleasing to see that many candidates knew how to expand the brackets in this question and gain all three marks.
	b		poor	1	**ecf** from (a) if value in (a) is between 0 and 200 **Examiner's Comments** Most candidates gained this mark; their skill of making a conclusion from interpreting the table was generally good.
	c		**any two from:** measuring results will vary / inaccurate; idea that fitness score is in ranges and not a continuous score; other factors such as BMI / mass / weight / age / (short term) injury	2	**Examiner's Comments** Candidates rarely considered the idea that measuring pulse rates could cause problems or the idea that fitness was measured in ranges. Many candidates managed to suggest another suitable factor.
			Total	**6**	

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Question			Answer/Indicative content	Marks	Guidance
9	a		<table><tr><td>With a very low income, women are certain to get heart disease.</td><td></td></tr><tr><td>In women, each time income is halved, the risk of heart disease is doubled.</td><td></td></tr><tr><td>Men are more at risk of heart disease than women.</td><td>✓</td></tr><tr><td>With a high income, women are more at risk of heart disease than men.</td><td></td></tr><tr><td>There are other risk factors for heart disease apart from income.</td><td></td></tr><tr><td>No one at high income gets heart disease.</td><td></td></tr><tr><td>For men, the lower the income the greater the risk of heart disease.</td><td>✓</td></tr><tr><td>From middle to high income, the risk for women remains unchanged.</td><td>✓</td></tr></table>	3	if more than three boxes are ticked deduct one mark for each additional tick Examiner's Comments This question required candidates to use the graph about heart disease to draw conclusions. Over half of the candidates knew at least 2 of the correct conclusions and stronger candidates knew all 3.
	b		C; 4	2	accept any unambiguous indications using lines on table Examiner's Comments This question was testing candidate's knowledge that correlation does not always prove causation in relation to the data given. Most candidates scoring 1mark usually scored this for the beginning of the sentence “C”.
			Total	5	

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Question			Answer/Indicative content	Marks	Guidance
10			**Any three from:** having (type 2) diabetes increases his risk of cardiovascular disease / does not make it certain ✓ example of lifestyle change to decrease his risk (of getting cardiovascular disease) ✓ second example of lifestyle change to decrease his risk (of getting cardiovascular disease) ✓ control/treat diabetes to reduce risk of developing cardiovascular disease ✓ visit the doctor / get medical advice ✓	3 (AO 2.1 × 3)	**ALLOW** examples including, e.g. stop smoking / (more) exercise / low salt diet / low fat diet / take medication to reduce blood pressure / lower BMI **DO NOT ALLOW** "eat healthy/go on a diet" unless explained **ALLOW** idea of low sugar diet (to control diabetes) **Examiner's Comments** This question gave candidates the opportunity to demonstrate their knowledge of risk factors for cardiovascular disease (CVD). Many good responses focussed on aspects of lifestyle that would affect the risk of CVD. High-scoring responses were specific about lifestyle changes that would reduce the risk of CVD (e.g. reduce salt/fat in the diet, stop smoking, exercise more), while responses that relied on vague, catch-all advice (e.g. stay healthy, eat healthily, go on a diet) were not credited marks. The idea that having type 2 diabetes increases the risk of CVD but does not make it certain, was rarely seen.
			Total	3	

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