OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



MARK SCHEME

M2 HANDLING DATA

SCORE	PERCENTAGE
/44	%

STEMUP

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Question			Answer/Indicative content	Marks	Guidance
1			D ✓	1 (AO2.2)	
			Total	1	
2		i	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 32 award 2 marks 34 + 29 + 33 = 96 ✓ 96 ÷ 3 = 32 ✓	2 (AO2.2)	ALLOW answer in the space under the table but answer on answer line in table takes preference ALLOW ECF for mean calculation
		ii	temperature ✓	1 (AO2.1)	
		iii	identifies variability in each point plot / gives an estimate of level of uncertainty ✓	1 (AO1.2)	ALLOW can plot range/error bars ALLOW large error bars variability is high/ORA ALLOW high variability then reliability is low/ORA ALLOW idea of the spread of data at each point and possibly identify/eliminate outlier/anomaly ALLOW ranges overlap the data at those 2 points isn't significantly different
		iv	Any two from: as temperature increases enzyme activity increases ✓ optimum enzyme activity between 25^0C and 35^0C enzyme activity ✓ but somewhere between 30^0C and 35^0C enzyme activity starts to decrease ✓ idea decrease in rate (after 35^0C) due to denaturing ✓	2 (AO3.1a)	ALLOW idea that as temperature increases/gets higher so does rate of (enzyme) reaction / gas release / ORA ALLOW higher temperature the faster the enzyme activity ALLOW enzyme starts to denature above 30^0C/between 30^0C and 35^0C
			Total	6	
3		i	The higher the BMI then the higher the mass of urea (in urine) / ORA ✓	1 (AO2.1)	ALLOW positive correlation IGNORE they are directly proportional IGNORE linear relationship

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Question			Answer/Indicative content	Marks	Guidance
		ii	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 0.0016 (g/cm^3) award 2 marks 1.6 ÷ 1000 ✓ = 0.0016 (g/cm^3) ✓	2 (AO2.2)	ALLOW 1.6 x 10^{-3}
		iii	idea that there is a greater increase in mass of urea as BMI increases in Fig 22.2/second graph ✓ idea that first graph/22.1 has stronger correlation / more points closer to line of best fit / less spread of data ✓	2 (AO2 x 3.2b)	ALLOW larger mass of urea per BMI gained ALLOW line is steeper/higher gradient in Fig22.2 IGNORE higher BMI for greater mass of urea ALLOW second graph does not follow the line of best fit so closely
			Total	5	

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Question			Answer/Indicative content	Marks	Guidance
4	a		to allow a valid comparison of the results✓	1 (AO3.1b)	
	b	i	correct plots ✓✓ smooth curved line between points ✓	3 (AO3 x 2.2)	**ALLOW** +/- half a square All correct = 2 marks 3 or 4 plots correct = 1 mark **DO NOT ALLOW** sketchy line / line thicker than half a square
		ii	increases up to 10 days/70^{o}C ✓ then decreases ✓	2 (AO3.1a)	**ALLOW** increases up to 9-11 days **ALLOW** increases by 44^{o}C
		iii	**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 39 (^{o}C) award 2 marks** 70-31 ✓ = 39 (^{o}C)✓	2 (AO2.2) (AO1.2)	
		iv	normal compost is made by aerobic respiration✓ aerobic respiration releases more energy than anaerobic respiration✓	2 (AO2 x 2.1)	2 correct ticks = 2 marks 1 correct ticks = 1 mark 3 ticks two correct = 1 mark 3 ticks one correct = 0 marks 4 or more ticks = 0 marks
	c	i	**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 8 (kg) award 3 marks** 1500-1200 **OR** 300 ✓ 300/40 **OR** 7.5 ✓ = 8 (kg) ✓	3 (AO3 x 2.2)	**ALLOW** one mark for clear evidence of rounding incorrect answer correctly to the nearest whole number
		ii	less carbon dioxide is produced ✓	1 (AO3.1b)	**ALLOW** less contribution to global warming / greenhouse effect / climate change
			Total	**14**	

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Question			Answer/Indicative content	Marks	Guidance
5			man D d woman d Dd dd d Dd dd ✓ 50% / 0.5 / ½ ✓	2 (AO1 x 2.2) (AO1 x 3.1a)	ALLOW 1 in 2 or 1:1 ALLOW ecf for probability
			Total	**2**	
6			D ✓	1 (AO2.2)	
			Total	**1**	
7		i	The higher the BMI then the higher the mass of urea (in urine) / ORA ✓	1 (AO2.1)	ALLOW positive correlation IGNORE they are directly proportional IGNORE linear relationship
		ii	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 0.0016 (g/cm^3) award 2 marks 1.6 ÷ 1000 ✓ = 0.0016 (g/cm^3) ✓	2 (AO2.2)	 ALLOW 1.6×10^{-3}
		iii	idea that there is a greater increase in mass of urea as BMI increases in Fig 17.2/second graph ✓ idea that first graph/17.1 has stronger correlation / more points closer to line of best fit / less spread of data ✓	2 (AO2 x 3.2b)	ALLOW larger mass of urea per BMI gained ALLOW line is steeper/higher gradient in Fig17.2 IGNORE higher BMI for greater mass of urea ALLOW second graph does not follow the line of best fit so closely
			Total	**5**	

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Question			Answer/Indicative content	Marks	Guidance
8		i	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 2.3 (cm^3 / min) award 3 marks $\frac{25+23+22}{3} = 23.3333333$ ✓ $\frac{23.3^{\cdot}}{10} = 2.3333333$ ✓ = 2.3 (cm^3 / min) ✓	3 (AO1 x 1.2) (AO2 x 2.2)	**ALLOW** one mark for clear evidence of rounding incorrect answer correctly to one dp.
		ii	increased movement of molecules / increased kinetic energy ✓ therefore, more chance of substrate colliding with enzymes/active sites ✓ more chance of substrate entering active site ✓	3 (AO2 x2.1)	increased KE of enzymes and substrates leads to more collisions = 2 marks **ALLOW** more enzyme-substrate complexes forming
			Total	**6**	
9	a		smallest nucleotide allele chromosome largest genome	1 (AO1.1)	
	b		66000000 ÷ 500 = 132 000 ✓	1 (AO2.2)	**ALLOW** 0.132 million or 132 thousand
	c		man D d woman d Dd dd d Dd dd ✓ 0.5 / 50(%)✓	2 (AO2.2) (AO3.1a)	**ALLOW** appropriate use of other lower/upper case letters **ALLOW** ECF **ALLOW** 1 in 2 / ½ / 1:1 ✓ **DO NOT ALLOW** 1:2
			Total	**4**	

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