

Applied Science

Advanced Subsidiary GCE

Unit **G623**: Cells and Molecules

Mark Scheme for January 2011

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Question		Grade	Answer	Mark	Guidance
1	a	2c/d 2e/u	A = Nucleus/ nucleoplasm/ chromatin ✓ B = Chloroplast ✓ C = Vacuole ✓ D = Cell wall ✓	4	
	b	c/d e/u	Actual length = 80 ✓ (Accept 79 – 81) 0.053(mm); (accept 80÷1500); (accept 0.0533) ✓ If 79 mm = 0.053/0.0526 If 81 mm = 0.054	2	ACCEPT tolerance of +/- 1mm for measuring length XY. ACCEPT 1 mark for correct measurement. ACCEPT ecf for correct calculation but incorrect measurement.
	c	i	2c/d e/u [Level 1] Candidates show a high level of understanding & includes a detailed description, of valid points, expressed clearly and logically. (3 marks) [Level 2] Candidates show some understanding and includes a description of valid points, expressed clearly. (2 marks) [Level 3] Candidates show a basic level of understanding of valid points written in sentences but with limited description. (1 marks)	3	<i>valid points to include:</i> <ul style="list-style-type: none"> • Calibrate eye piece graticule • Using stage micrometer • Count number of arbitrary epg units covering cell • Repeat/measure length of many cells • Calculate mean • Convert to mm/μm • Compare with others to check reliability • Accept Move slide around (to count more than one cell)
	c	ii	c/d Cell would cover more eye piece divisions/units (as would appear larger but epg scale stays the same) (OWTTE) ✓	1	ACCEPT cell would be bigger/larger <u>on the scale</u>
			Total	10	

Question			Grade	Answer	Mark	Guidance
2	a	i	c/d e/u	Appropriate plotting of points ✓ ✓	2	Award two marks for 6-7 points correctly plotted. Award 1 mark for 4-5 points correctly plotted. Plotting of points – allow tolerance of +/- 0.5 square
		ii	e/u	Appropriate smooth line of best fit ✓	1	REJECT 'hairy lines'. REJECT if no ruler used.
	b		a/b	Use graph to find concentration of sucrose where there is 0% change Accept 0.34-0.36 Mol dm ⁻³ ✓	1	ecf for sucrose concentration if taken from graph at intersect of x-axis
	c		c/d	<i>any one from:</i> To prevent evaporation of water ✓ To stop/reduce changes to water potential/solute potential ✓ To prevent contamination ✓	1	
	d		2c/d	<i>any two from:</i> To allow comparison ✓ Not all the discs were the same mass at the start ✓ Not all the discs were the same thickness ✓ Not all the discs were identical/variation in potato discs ✓ Discs may have been obtained from different parts of the potato ✓ Discs may have different surface areas ✓	2	REJECT fair test
				Total	7	

Question			Grade	Answer	Mark	Guidance
3	a	i	e/u	Test not 100% accurate/open to error ✓	1	<p>ACCEPT one from: Whether to inform relatives ✓ Possible life sentence for other family members ✓ Whether to pursue selective abortion ✓ Whether or not patient should have children ✓</p> <p>Human rights issues of patient including: Employment / insurance / mortgage facilities ✓ AVP with qualification e.g. religious viewpoints/ increased risk of miscarriage ✓</p>
		ii	c/d e/u	<p>any two from:</p> <p>Determination of blood groups ✓ White cell/Red cell/Platelet, counts ✓ Haematocrit/packed cell volume ✓ Mean cell volume ✓ (Mean cell) haemoglobin concentration ✓ Drug tests ✓ Antibody indicators/Hepatitis/HIV/ELISA test ✓ Abnormalities in blood cell types e.g. sickle cell ✓</p>	2	<p>ACCEPT full blood count as alternative to white/red/platelet counts; REJECT ref to cervical smear tests. IGNORE karyotyping</p>
	b	i	c/d e/u	<p>any two from:</p> <p>Equipment is cheap(er) to buy ✓ Equipment needs less expertise to operate / less training needed for operation ✓ Specimen/tissue, preparation is quicker ✓ Tissue preparation does not involve complex staining ✓ Tissue preparation less likely to cause, artefacts/distortions ✓</p>	2	<p>ACCEPT functional differences of LM e.g. higher magnification/resolution not needed ✓</p> <p>IGNORE ref to dead/ living cells/ cells viewed in a vacuum</p>

Question			Grade	Answer	Mark	Guidance
3	b	ii	a/b c/d	<p>Evidence - <i>any one</i> from: enlarged nuclei/irregular shaped nuclei ✓ fatter/larger cells ✓ abundance of chromatin ✓</p> <p>Explanation - <i>any one</i> from: Uncontrolled, cell division/mitosis ✓ Damage to DNA ✓ HPV infection (owtte) ✓ Increase in DNA replication ✓ Increase in protein synthesis ✓</p>	2	ACCEPT presence of koilocytes in CIN.
	c		3a/b	<p><i>any three</i> from:</p> <p>Specific ✓ Anti hCG (monoclonal) antibodies in test/ AW ✓ Bind to hCG/ antigen (in urine) ✓ Colour change/ fluorescent / radioactive molecule indicator ✓</p>	3	
Total					10	

Question		Grade	Answer	Mark	Guidance
4	a	6e/u	1 = Black ✓ 2 = Iodine / iodide ✓ 3 = Emulsion ✓ 4 = Acid ✓ 5 = Lilac ✓ 6 = Benedicts ✓	6	
	b	i	a/b 2c/d e/u V = phosphate/phosphoric acid ✓ W = (pentose) sugar/deoxyribose ✓ X = base/ guanine / cytosine ✓ Y = nucleotide ✓	4	REJECT ref to 'A' and 'T' bases
		ii	c/d Hydrogen bonds ✓	1	
	c	i	c/d Codon ✓	1	IGNORE 'Triplet'
		ii	3a/b CAT ✓ GTA ✓ GAG ✓	3	
		iii	3a/b Consequence – any <i>two</i> from: Codon becomes CUC/subsequent codon sequences change ✓ Histidine replaced by leucine ✓ Secondary/tertiary structure of polypeptide changes ✓ Frameshift ✓ Reason: Code is non-overlapping/each codon is read separately ✓	3	
			Total	18	

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