Question	Marking Guidelines	Mark	Comments
1(a)(i)	Golgi (apparatus/body);	1	
1(a)(ii)	1. Nucleus; 2. Mitochondrion; 3. Endoplasmic reticulum/ER; 4. Lysosome;	2 max	1. Accept: nucleolus/nuclear envelope/nuclear membranes 2. Accept cristae/mitochondrial membranes 3. Ignore reference to rough/ smooth 4. Reject lysozyme
1(b)	(Aerobic) respiration/ATP production/provide energy;	1	Accept Krebs cycle/ electron transport. Ignore 'produces energy' Reject anaerobic respiration Ignore what energy is used for
1(c)	1. High/ better resolution; 2. Shorter wavelength; 3. To see internal structures/ organelles/named organelles;	2 max	3. Accept ultrastructure

Question	Marking Guidelines	Mark	Comments
2 (a)	2 marks for correct answer 0.2;; 1 mark for 6/30;	2	Accept concentration ÷ time
(b)	1. (Uptake) decreases/ slower, then no further uptake / uptake stops; 2. (Decreases) to 20 - 22/no uptake after 20/22 minutes;	2	2. Accept: (only) 1.6 (arbitrary units) absorbed / (only) drops to 8.4 Is for correct use of data from graph
(c)	1. Stops/ reduces /inhibits respiration; 2. No/less energy released/ ATP produced; 3. (ATP/energy needed) for active transport;	3	1. Accept: inhibits respiratory enzymes 2. Ignore: less energy produced/ made 3. Accept ref to Na^+ pump/ description of active transport Ignore consequences of less Na^+ in cell

Question	Marking Guidelines	Mark	Comments
3 (a)	(Micro)organism that causes disease / harm to body / an immune response;	1	Accept: named microorganism that causes disease Allow infection
(b)	1. Phagocyte attracted by a substance/ recognises (foreign) antigen; 2. (Pathogen)engulfed/ ingested; 3. Enclosed in vacuole/ vesicle/ phagosome; 4. (Vacuole) fuses/joins with lysosome; 5. Lysosome contains enzymes; 6. Pathogen digested/ molecules hydrolysed;	4 max	1. accept named substance eg chemical / antigen 2. Accept: description 5. Accept named example of enzyme 6. Neutral: Destroyed
(c)	1. Antigens (on pathogen) are a specific shape/ have specific tertiary / 3D structure; 2. Antibody fits/binds / is complementary to antigen/ antibody-antigen complex forms; *OR* 3. Antibodies are a specific shape / have specific tertiary/ 3D structure; 4. Antigens (on pathogen) fit/ bind/ are complementary to antibody / antibody-antigen complex forms;	2	1/3 Structure alone is insufficient Reject – active site

Question	Marking Guidelines	Mark	Comments
4 (a)	1. Add Benedict's; 2. Heat; 3. Red/orange/yellow/green (shows reducing sugar present);	3	Hydrolyse with acid negates mp1 2. Accept warm, but not an unqualified reference to water bath 3. Accept brown
(b)(i)	1. Starch hydrolysed / broken down / glucose/maltose produced; 2. Lower water potential; 3. Water enters by osmosis;	3	1. Neutral: Sugar produced
(b)(ii)	Only 2 pHs studied/ more pHs need to be tested;	1	Accept: different amylase may have a different optimum pH

Question	Marking Guidelines	Mark	Comments
5-(a)	Hydrolysis (reaction);	1	Accept phonetic spelling
(b)	1. Too big/ wrong shape; 2. To fit/ bind/ pass through (membrane/ into cell/through carrier/ channel protein); 3. Carrier / channel protein;	3	1. Wrong charge – neutral Accept insoluble 3. Accept carrier/ channel protein not present
(c)	1. Villi /microvilli damaged/ destroyed; 2. Reduced surface area ; 3. For (facilitated) diffusion/ active transport;	3	2. Accept fewer channel/ carrier proteins 3. Must be in correct context
(d)	Foreign/(act as) antigen /non-self;	1	Reject foreign cells
(e)	1. Dose to be given; 2. No (serious) side effects; 3. How effective; 4. Cost of drug;	2 max	Accept: interaction with other drugs

Question	Part	Marking Guidance	Mark	Comments
6	(a)	Given only saline; Otherwise treated exactly the same way;	2	
	(b)	Ethical consideration, e.g., leads to death/suffering of mice; Large number to improve reliability / reduce sampling error; Number of mice related to cost/space available/animal husbandry;	2 max	
	(c)	Vary in shape / do not grow uniformly;	1	Q Allow descriptions of variation in shape.
	(d)	7.44 and 1.74;; 7.42 and 1.72;; (Ratio) 4.28 : 1;; (Ratio) 4.31 : 1;; (Percentage decrease) 76.6%;; (Percentage decrease) 76.8%;;	2 max	Any of the answers shown gain two marks. An answer of 23.4% or 23.2% Percentage decrease gains one mark. Correct method of calculating rate/ratio/percentage increase with an incorrect answer gains one mark.
	(e)	Reference to Mitosis; As chromosomes cannot attach (to spindle)/ chromatids cannot separate (on spindle); Cell division/cell cycle slows down;	3	Q Do not penalise confusion between chromosomes and chromatids in second marking point Q Mitosis slows down = 2 marks Q Mitosis stopped = 1mark Q Mitosis must be spelt correctly
	(f)(i)	(Degree of) spread/variation from the mean;	1	
	(f)(ii)	Both chemicals (on their own) slow down growth/are effective; Taxol is more effective than OGF; Combined treatment (seems) most effective; SD overlap for OGF with taxol and taxol (on its own) so not conclusive/could be chance/both treatments could be equally effective;	4	Q Ignore all references to significance