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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Biology 5416

Specification B

BYB1 Core Principles

Mark Scheme

2008 examination - January series

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Question 1

(a)

Cell	Feature			
	Nucleus	**Cell wall**	**Cell surface membrane**	**Ribosomes**
Epithelial cell from the small intestine	√	**X**	√	√
Palisade mesophyll cell	√	√	√	√
Bacterium	**X**	√	√	√

3

(b) Helical/spiral/coiled (shape) – compact;
Insoluble – osmotically inactive / does not leave cell;
Large size– does not leave cell / many glucose/monomers;
Branched – glucose/monomers easily/quickly removed; 2 max
(Two features without explanations = one mark)

(c) Provides glucose for respiration/as energy source/for ATP production; 1

Total 6

Question 2

(a) Biuret / copper sulphate and sodium hydroxide; 1

(b) (i) 39.8 - 39.9g; 1
(Allow 39.6)

(ii) No double bonds between carbons/in hydrocarbon chain; 1
(Allow appropriate description)

(c) (i) Heat with benedict's (solution);
Red / orange colour; 2

(ii) Standardised technique e.g. same amount of biscuit / same volume of benedict's / heat for same period of time;
Compare colour / compare mass (of precipitate) / rate of colour production / different colours / use a colorimeter; 2

Total 7

Question 3

(a) Principle of dividing measured length by 10400;
(Ignore units)
8.6 - 8.75; 2
(Correct answer gains two marks)

(b) Rough endoplasmic reticulum produces/transport protein/involved in translation;
Ribosomes produces/transport protein/involved in translation;
Golgi body modifies proteins/enzymes / produce glycoproteins/vesicles;
Mitochondria provide ATP/energy;
Nucleus has DNA/genetic code for protein synthesis/transcription;
Vesicle / lysosome fuses with membrane/for exocytosis; 2 max

(c) (i) Mass /density; 1

(ii) Prevents osmosis / no (net) movement of water (into / out of organelle);
So (organelle) does not burst / shrivel; 2
(Damage = neutral)
(Reference to cell rather than organelle negates first mark obtained)

Total 7

Question 4

(a) (i) Condensation; 1

(ii) Dipeptide and water; 1
(Any order)

(b) Protein receptors / glycoproteins;
Specific tertiary/3D structure / complementary (shape); 2
(Reference to active site negates second marking point)

(c) (i) Principle of dividing by 85 - 86/8.5 - 8.6;
0.19 - 0.27; 2
(No marks for correct answer derived incorrectly)

(ii) More soluble; 1

(iii) Asp and glu; 1

Total 8

Question 5

(a)	(i)	Villus;	1
	(ii)	Long length / folds / microvilli;	1
(b)	(i)	Diffusion / facilitated diffusion;	1
	(ii)	Active transport; Requires energy; Carrier proteins; OR Move in with sodium (ions); Carrier/channel proteins / symporters; Active transport (of ions);	3
	(iii)	More <u>carriers</u> / different rate of action of <u>carriers</u>;	1
			Total 7

Question 6

(a)	Large <u>surface area to volume</u> (ratio); Short <u>diffusion</u> distance;	2
(b)	Water and blood flow in opposite directions; (Oxygen) concentration gradient/difference maintained; Maintains <u>diffusion</u> (gradient) / <u>diffusion</u> always occurs;	3
(c)	Increase in temperature increases rate of ventilation; (More) oxygen required for (increase in) respiration / less dissolved oxygen at higher temperatures;	2
		Total 7

Question 7

(a) Formation of melanin (increases colour intensity); 1

(b) (i) Steeper increase, reaching same colour intensity; 1

(ii) Less steep increase, which would reach same colour intensity; 1

(c) Competitive inhibitor *(not a mark)*

1 Inhibitor similar in shape to substrate;
(Reject 'same')
2 Competes for active site / binds at active site;
(Reject 'reacts with')
3 Less substrate attaches / fewer enzyme-substrate complexes;

Non-competitive inhibitor *(not a mark)*

4 Inhibitor differs in shape to substrate;
5 Binds at position other than active site/ binds at allosteric site/inhibitor site;
6 Alters active site so substrate cannot bind / substrate attaches but no reaction/product; 6

(d) Addition of extra substrate;
Rate of reaction increased if competitive / no change if non-competitive; 2

Total 11