



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

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GCE

Biology B

Unit BYB1

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Question 1

- (a) (i) Nucleus; 1
- (ii) Correct answer ($3\mu\text{m} = 2$ marks)
error with measurement, but clearly derived by dividing drawing size
by magnification = 1 mark; 2
- (b) (i) Ice-cold – prevents enzymes working/autolysis/self digestion; 2
- (ii) Isotonic – prevents osmotic effects to organelles/osmosis/bursting/
shrinking; 2
- (c) A;
Nucleus is largest/densest/heaviest organelle (sediments first/lowest spin speed);
(Reject reference to plant organelles/cell wall) 2
- (d) O_2 uptake / ATP production / CO_2 production (not respiration / heat); 1
- Total 8

Question 2

(a)

Beaker	Test using Benedict's solution	Test using Biuret solution	Boiled with hydrochloric acid, neutralised, then tested with Benedict's solution
1	Blue colour	Lilac colour	Blue colour
2	Blue colour	Blue colour	Brick-red colour
3	Brick-red/orange colour	Lilac colour	Brick-red colour

;

;

;

Each column all correct for 1 mark = 3 total (MUST be a colour); 3

- (b) $R_f = \frac{\text{distance spot travels (39/42)}}{\text{distance front travels (96/97)}} ;$
0.40 - 0.44; (correct answer = 2 marks) 2
- (c) B = glucose
C = fructose; (Both correct for 1 mark, but any order) 1

Total 6

Question 3

(a)

Function	Phospholipids	Protein
May act as hormone receptors	✗	✓
May act as enzymes	✗	✓
Involved in active transport	✗	✓

Mark as columns. All correct for 1 mark.

2

(b)

Active transport/uptake;

Ions accumulated/move/go against a concentration gradient/highER

Concentration (inside root hair) (not larger number) (minerals = neutral);

2

Total

4

Question 4

(a)

One cell thick/thin (not thin membrane)/flattened cells for faster diffusion/shorter diffusion pathway; (Reject greater/more)Large surface area for faster diffusion; (Reject greater/more)Ventilation to maintain a diffusion/concentration gradient;

2 max

NB TWO correct features = 1 mark maximum

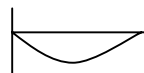
2

(b) (i)

Decreases first from zero;

Then increases to zero;

'U' shape (not starting at zero) = 1 mark maximum



2

(ii) $\frac{60}{3} = \underline{20}$;

1

Total

5

Question 5

(a)

Secretion/release of enzymes (or described) not excretion;Absorption of/takes in (soluble) products/named soluble product/nutrients/food;Principle of extra-cellular digestion (e.g. breaks nutrients down outside cell) = 1 mark;

2 max

(b)

Mitochondria release/supply energy or release/supply/produce/make

ATP;

2

For synthesis/growth/cell division/mitosis/active uptake;

4

Total

8

Question 6

(a) (i)	Activation energy;	1
(ii)	Activation energy lower, but within peak; Curve starting and finishing at original energy levels; (Higher curve disqualifies)	2
(iii)	pH drops/lowers/becomes acidic; <u>Fatty acids</u> formed (when lipase breaks down lipids);	2
(b) (i)	Correct placement of X on stomach/pancreas;	1
(ii)	Correct placement of Y on liver (Reject gall bladder);	1
(iii)	Emulsifies/produces small droplets (of triglycerides); Increases surface area/large surface area available (digestion); <u>OR</u> Neutralises (stomach) acid; Optimum pH for lipase/enzymes (wrong enzymes named = disqualify);	2
	Total	9

Question 7

(a)	<u>Temperature</u> Rate of reaction increases; Increasing temperature increases rate of movement of molecules/kinetic energy; Collide more often/substrate enters active site more often/more enzyme-substrate complexes formed; Up to <u>optimum</u> ; Rate of reaction decreases; High temperatures cause denaturation/loss of tertiary structure/3D structure; By breaking specified bonds (not peptide bond); Active site altered/substrate cannot bind/fit/ N.B. If graphically explained, axes must be labelled or scores 0 marks.	6
(b) (i)	Inhibitor is a different shape to substrate; Binds at position other than active site/allosteric site; Alters shape of <u>active site</u> ; Substrate cannot bind/enzyme-substrate complex not formed;	4
(ii)	<u>Competitive inhibition</u> ; Ethanol/ethylene glycol compete for same active site; Molecules similar shape (not same)/both complementary to/both fit active site; Prevents/slows production or build up of oxalic acid/toxic products; Ethylene glycol excreted (without causing death);	4
	Total	14

Question 8

- (a) Chemical reactions occur in solution;
Allows transport/secretion/excretion/dispersal of substances;
High specific heat capacity (e.w.) so minimises temperature fluctuations;
High latent heat of evaporation so cooling effect of sweat/transpiration;
Provides internal support e.g. hydrostatic skeleton/amniotic fluid/turgidity;
Provides external support e.g. aquatic organisms;
High surface tension e.g. pond skaters, cohesion-tension;
Transparent e.g. allows light penetration for aquatic organisms;
Less dense when frozen so ice floats and insulates;
Reactant e.g. hydrolysis/photosynthesis;
Lubricant e.g. synovial fluid/pleural fluid/mucus; 5
- (b) (i) Initial mass of cylinders not identical;
To be able to directly compare the results; 2
- (ii) From 0.3 mol dm^{-3} to 0.1 mol dm^{-3} water moves into potato cells;
By osmosis;
So mass increases;
More water has entered potato cells 0.1 mol dm^{-3} / converse; 4
- (iii) 0.35;
No mass change/no net osmosis/volume of water in = volume of water out; 2
- (c) Range from -511 to -549 kPa;
Reason e.g. Water moves from A to B, so must be lower than -510 and
Water moves from B to C, so must be higher than -550 ; 2
- Total 15

Quality of Written Communication 1