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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Biology 5416

Specification B

BYB1 Core Principles

Mark Scheme

2007 examination - June series

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Question 1

(a) (i) Ribosomes;
Cytoplasm;
DNA; 1 max

(ii) Any three suitable answers

For example,

No nuclear envelope/nucleus;
No mitochondria;
No chloroplasts;
No vacuole;
Mesosomes present / folded cell (surface) membrane;
Plasmids/loops of DNA / non-linear DNA;
Capsule not in plant cells;
Different composition of cell wall;
DNA does not associate with proteins/form chromosome;
No Golgi;
No SER/RER;
Smaller/70S ribosomes; 3 max
(allow one mark for "no membrane-bound organelles" if no named organelle in answer)

(b) Smooth endoplasmic reticulum/SER;
Synthesis of lipids/transport of lipids or polypeptides/drug detoxification;

OR

Rough endoplasmic reticulum/RER;
Attachment of ribosomes/protein synthesis/protein transport;

OR

Golgi (body);
Formation of lysosomes or (secretory) vesicles / adding sugars to proteins or lipids / secretion of enzymes/hormones;

OR

Lysosome;
Digestion of damaged/worn-out organelles / autolysis; 2 max
(*As ribosomes are often referred to as membrane-bound, if ribosome is the named organelle, give no mark for name of organelle, but allow one mark for the correct function – i.e.Protein synthesis/translation)*

Total 6

Question 2

(a) Muscle (in walls);
Circular and longitudinal;
Contraction of circular (muscle pushes food down oesophagus); 2 max

(b) Glandular cells/glands;
Secrete alkali (mucus); 2

(c) Villi/microvilli;
(Many) capillaries/lacteals;
Single cell layer;
Channel/carrier proteins;
Mitochondria;
Enzymes in membrane;
Muscles (in villi); 3 max

Total 7

Question 3

(a) (i) As lipid solubility increases the rate increases;
(Membrane) consists of (double layer) of lipid/phospholipids; 2

(ii) Small molecules diffuse faster;
Higher kinetic energy / easier to pass through pores / between phospholipid molecules; 2

(b) Concentration/diffusion gradient;
Number of carriers/channel/proteins;
Temperature; 2 max

Total 6

Question 4

(a) Long straight/unbranched molecule;
Bonded together by hydrogen bonds;
Forming microfibrils;
High strength (in correct context); 3 max

(b) Includes H (from OH) and OH; 1

(c) O and OH reversed on carbon **1** and rest of molecule correct; 1

Total 5

Question 5

(a) Draw origin line/line where spot is placed;
Add spot and dry;
Several spots of orange juice on same spot;
Put in tank with first solvent with spot above solvent;
(Run chromatogram and) mark solvent front;
(Dry and) rotate paper turned through 90^{o} and put into different/second solvent;
Spray with ninhydrin/locating agent; 4 max

(b) Glutamic acid; 1
Reasoned explanation or correct Rf formula; 1

Total 6

Question 6

(a) Production of fatty acids;
(Fatty) acids (produced) cause fall in pH; 2

(b) Substrate/lipids all used up;
Equilibrium reached;
(pH) denatures enzyme; 1 max

(c) Bile salts produce many small lipid droplets/emulsifies lipid;
Large surface area so more rapid action of lipase/enzyme; 2

(d) To show that lipase has to be present for pH to change/reaction to take place / to show that bile salts do not digest lipids; 1

Total 6

Question 7

(a) (Different) enzymes have <u>different</u>/specific tertiary structure or <u>different</u>/specific active sites;
Active site has shape that fits substrate;
Amino acids (either side of peptide bond) have different shapes;
Due to the R group; 3 max

(b) Action of endopeptidase forms many ends of (peptide) chains;
Exopeptidase removes amino acid at end of chain;

OR

Action of endopeptidase forms more substrate molecules for exopeptidases;
More chance of collision between exopeptidase and substrate; 2

Total 5

Question 8

(a) (i)
1 From 0 – 0.3 secs;
2 Mouth closes and <u>floor</u> raised/ mouth cavity contracts;
3 Raises <u>pressure</u> forcing water over gills / from buccal cavity to opercular cavity;
4 Opercular cavity contracts;
5 This increases pressure and forces water through operculum;
6 From 0.3- 0.5 secs;
7 Mouth opens and <u>floor</u> of mouth cavity lowers /mouth cavity expands;
8 Water enter mouth due to decrease in pressure;
9 From 0.5 – 0.6 secs;
10 Opercular cavity expands;
11 Lower pressure causes water to flow over gills; 7 max
(*max 2 for correct timing of event, max 6 if no timings*)

(ii) 0.47 - 0.50 seconds;
Pressure in mouth cavity greater than opercular cavity; 2

(b) (i) Line drawn under but close to line on graph; 1
(allow mirror image as direction of distance measurement not shown)

(ii) Concentration/diffusion gradient maintained / equilibrium not reached;
Across whole length of gill/filament/lamella; 2

Total 12

QWC 1