A-Level Biology

Cell Structure

Mark Scheme

Time available: 73 minutes
Marks available: 60 marks

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1.

(a) W – (cell surface) membrane
X – cell wall
Y – capsule
Z – flagellum

Four correct = 2 marks.

Three or two correct = 1 mark.

Y - Ignore references to slime/mucus

Y - Reject capsid

Z - accept flagella

2

(b) W - Phospholipids;
X - Murein / glycoprotein;

X - Accept peptidoglycans.

Accept phonetic spellings

2

(c) Binary fission;

Reject binary fusion

1

(d) 8.64×10^5;;

Accept 864 000 however expressed, e.g. 864×10^3

Allow one mark for

$2^6 = 64$

OR

$64 / 26 \times (1.35 \times 10^4)$

2

[7]

2.

(a) **B** Golgi (body / apparatus);

C Mitochondria / mitochondrion;

2

(b) 1. Chloroplasts / plastids

2. Cell wall

3. Cell vacuole

4. Starch grains / amyloplasts;

*Any **2** for **1** mark*

1 max

(c) 1. Ice-cold – Slows / stops enzyme activity to prevent digestion of organelles / mitochondria;

2. Buffered – Maintains pH so that enzymes / proteins are not denatured;

Reject reference to cells

3. Same water potential – Prevents <u>osmosis</u> so no lysis / shrinkage of organelles / mitochondria / **C**;

Ignore damage

For each mark must link reason to relevant property

3

(d) 1. Break open cells / homogenise / produce homogenate;

2. Remove unbroken cells / larger debris;

2

(e) Nucleus / nuclei;

1

(f) Mitochondria / organelle **C** less dense than nucleus / organelle in first pellet;

Accept 'lighter' for less dense

1

[10]

3. (a) 1. DNA in nucleus is code (for protein);

2. Ribosomes/rough endoplasmic reticulum produce (protein);

Accept rER for 'rough endoplasmic reticulum'

3. Mitochondria produce ATP (for protein synthesis);

4. Golgi apparatus package/modify;

OR

Carbohydrate added/glycoprotein produced by Golgi apparatus;

Accept body for 'apparatus'

5. Vesicles transport

OR

Rough endoplasmic reticulum transports;

6. (Vesicles) fuse with cell(-surface) membrane;

Accept exocytosis at cell membrane

4 max

(b) A section/slice (so nucleus in another part of cell)

OR

(Nucleus) not stained;

1

(c) **S** = Vacuole

T = Chloroplast;

Reject thylakoid/granum

Reject incorrect spelling

1

(d) High**er** resolution

OR

View internal structures;

1

(e) Correct answer of 4.71×10^7 for **2 marks**;;

Accept for 1 mark
Any answer showing conversion factor of 100 000 000 / 10^8
OR
Correct answer for any number divided by 150 eg
70.65 ÷ 150 / 0.471
OR
Any answer including digits 471 in this order, irrespective of position of decimal place

2

[9]

4.

(a)
1. Add drop of water to (glass) slide;
2. Obtain thin section (of plant tissue) and place on slide / float on drop of water;
3. Stain with / add iodine in potassium iodide.

3. Allow any appropriate method that avoids trapping air bubbles

4. Lower cover slip using mounted needle.

4

(b)
1. **W** – chloroplast, photosynthesis;
2. **Z** – nucleus, contains DNA / chromosomes / holds genetic information of cell.

2

(c)
1. High resolution;
2. Can see internal structure of organelles.

2

(d) Length of bar in mm × 1000.

1

[9]

5. (a) (i) (Aerobic) respiration;

Accept ATP production / energy release

Reject <u>anaerobic</u> respiration

Reject energy production

1

(ii) Golgi (apparatus / body);

Ignore smooth ER

1

(b) ('It' = Optical microscope)

Ignore reference to magnification

1. Has low resolution / not high enough resolution;

Accept converse relating to EM

2. (Because) wavelength of light not short enough / too long;

Accept larger wavelength

Accept statements that microscopes have a wavelength

2

[4]

6. (a) (i) Chloroplast;

1

(ii) Photosynthesis;

Uses light (energy);

To produce carbohydrates / starch / glucose / sugars / ATP / reduced NADP;

Note that candidates cannot be expected to have a detailed knowledge of photosynthesis.

max 2

(b) (i) **A**;

1

(ii) **C**;

1

(c) (i) Slows enzymes / prevents enzymes being denatured / prevents / stops self-digestion;

Ignore references to bacteria. Reject enzymes not working

1

(ii) To remove organelle C / nuclei;
Which are larger / more dense;

2

[8]

7.

(a) (i) Mitochondria site of respiration;
Production of ATP / release of energy;
For contraction;

Do not award credit for making or producing energy.

3

(ii) Enzymes are proteins;
Proteins synthesised / made on ribosomes;

2

(b) Lysosomes produce / contain enzymes;
Which break down / hydrolyse proteins / substances / cells of tail;

2

(c) 1. Chop up (accept any reference to crude breaking up);
2. Cold;
3. Buffer solution;
4. Isotonic / same water potential;
5. Filter and centrifuge filtrate;
6. Centrifuge supernatant;
7. At higher speed;
8. Chloroplasts in (second) pellet;

max 6

[13]