3.2.1 Cell Structure Question Pack MS

**Q1.**

(a)     (i)      (Aerobic) respiration;

*Accept ATP production / energy release*

*Reject anaerobic 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]**

**Q2.**

(a)     D;

G;

F;

**3**

(b)     Coronary arteries;

*Accept coronary artery*

*Ignore aorta, arteriole and capillary*

*Reject coronary veins*

*Do not accept coronary by itself*

*Accept phonetic spelling*

**1**

(c)     1.      No sketched / hanging / crossing lines / shading;

*Ignore stippling*

2.      Must look similar;

3.      Matrix **and** crista correctly labelled;

*Ignore any other labels*

4.      Correct scale stated (x 62 800);

*Accept other suitable scale given*

**4**

**[8]**

**Q3.**

(a)     B;

A;

E;

**3**

(b)     1.      (Many mitochondria) release energy / ATP **for** movement of vesicles / synthesis of protein / active transport;

*Must include function of organelle* ***and*** *use in context of milk production.*

*Ignore reference to lipid / triglyceride*

*Reject reference to mitochondria undergoing anaerobic respiration*

*Reject “produce energy”.*

*Reject “energy for respiration”*

2.      (Many Golgi) vesicles transport protein / glycoprotein / milk **to** cell membrane / **out of** cell;

*Must include function of organelle* ***and*** *use in context of milk production.*

*Ignore reference to lipid / triglyceride*

*Accept exocytosis as transport and release*

*Ignore references to protein synthesis*

**2**

**[5]**

**Q4.**

(a)     (Plasma / cell) membrane;

*Reject: nuclear membrane*

**1**

(b)     Nucleus / nuclear envelope / nuclear membrane / nucleolus;

*Accept: membrane-bound organelles only if an example has not been given*

Mitochondrion;

(Smooth / rough) ER;

Lysosome;

Microvillus / brush border;

*Neutral: villi*

Golgi;

Linear / non-circular DNA / chromosome;

*Neutral: DNA strands*

80S / denser / heavier / larger ribosomes;

*Neutral: ribosomes*

**2 max**

(c)     (i)      Higher resolution / higher (maximum) magnification / higher detail (of image);

***OR***

Allows internal details / structures within (cells) to be seen / cross section to be taken;

*Accept: ‘better’ instead of ‘higher’*

*Neutral: shorter wavelength*

*Reject: longer wavelength*

*Reject: can be used on living specimens*

***Q*** *Do not accept ‘clearer’ image*

**1**

(ii)     Thin sections do not need to be prepared / shows surface of specimen / can have 3-D images;

*Accept: can be used on thick(er) specimens*

*Reject: can be used on living specimens*

*Neutral: refs. to staining / preparation / artefacts / colour*

**1**

(d)     Two marks for correct answer of 0.42 – 0.46;;

One mark for incorrect answers in which candidate clearly divides measured width by magnification;

*Correct answer = 2 marks outright*

*Accept: 0.4 or 0.5 only if working is correct for 2 marks*

*Do not award a mark for 0.4 or 0.5 if there is no working out*

*Ignore rounding up*

**2**

**[7]**

**Q5.**

(a)     (i)     Golgi (apparatus / body);

**1**

(ii)     1.      Nucleus;

*Accept: nucleolus / nuclear envelope / nuclear membranes*

2.      Mitochondrion;

*Accept cristae / mitochondrial membranes*

3.      Endoplasmic reticulum / ER;

*Ignore reference to rough / smooth*

4.      Lysosome;

*Reject lysozyme*

**2 max**

(b)     (Aerobic) respiration / ATP production / provide energy;

*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;

*Accept ultrastructure*

**2 max**

**[6]**

**Q6.**

(a)

|  |  |
| --- | --- |
| The bacteriophage has a capsid and the bacterium has a cell-surface membrane; |  |

Third box down

*Reject if more than one box with tick. Ignore crossed-out ticks*

*Accept tick to right or left of correct box*

**1**

(b)     Correct number of times between

13.0 / 12.96 **and** 13.9 / 13.92 scores 2 marks;

One mark if correct sizes in ranges of

150.7nm to 154.4nm / 0.151μm to 0.154μm

**and** 1953.5nm to 2097.6nm / 1.954μm to 2.098μm;

***Both*** *lengths required for 1 mark credit*

*Accept refs to 150 / 0.15 and 2000 / 2*

*Ignore number of sig fig*

**2**

**[3]**

**Q7.**

(a)     1.      Granum / grana / thylakoid;

*Ignore references to membranes, stacks or discs.*

2.      Stroma;

*Allow phonetic spellings.*

**2**

(b)     1.      Absorbs / traps / uses light;

*Light dependent reaction = marking point 1.*

2.      For photosynthesis;

3.      Produces carbohydrates / sugars / lipids / protein;

*Accept any named product of photosynthesis for marking point 3.*

*Reference to light dependent and light independent reactions  
= two marks*

**2 max**

(c)     Correct answer in range of 2.53 - 2.66;

Any length divided by 30000 = 1 mark;

**2**

**[6]**

**Q8.**

(a)     1.      Macerate / homogenise / blend / break tissues / cells (in solution);

2.      Centrifuge;

3.      At different / increasing speeds until chloroplast fraction obtained;

*1.      Accept any suitable method to break tissues / cells / release organelles*

*2. and 3. Allow ‘perform differential centrifugation until chloroplasts obtained.’ for 2 marks*

**3**

(b)

|  |  |  |
| --- | --- | --- |
| **Feature** | **Mitochondrion** | **Chloroplast** |
| Double outer membrane | ✔ | ✔ |
| Starch grains |  | ✔ |
| Diffusion of oxygen into the organelle | ✔ |  |

*1 mark for each correct row*

*Crosses = blank space*

**3**

(c)     The site of aerobic respiration (reactions)

**OR**

ATP is made / ADP is phosphorylated;

*Reject ‘energy is produced’*

**1**

**[7]**

**Q9.**

(a)     Peptide;

***Q*** *Do not accept polypeptide  
Neutral: covalent*

**1**

(b)          (F) H J E (K);

*All three boxes correct = 2 marks  
Two boxes correct = 1 mark*

**2**

(c)     (Site of aerobic) respiration;

Release ATP / energy for active transport / transport against the concentration gradient / protein synthesis / exocytosis;

***Q*** *Reject: anaerobic respiration*

***Q*** *Reject: produces / makes energy*

*Accept: produces ATP for energy*

*Reject: produces ATP for respiration*

*Neutral: protein secretion*

**2**

(d)     (i)      Breaks open cells / disrupts cell membrane / releases cell contents / releases organelles / break up cells;

*Reject: breaks down cell wall*

*Neutral: separates the cells*

*Reject: breaks up cells so they can be separated*

*Reject: breaks up / separates organelles*

**1**

(ii)     Removes (cell) debris / complete cells / tissue;

*Neutral: to isolate organelle* ***G*** */ mitochondria*

*Neutral: removes unwanted substances / impurities*

*Reject: removes organelles / cell walls*

**1**

(iii)    Reduces / prevents enzyme activity;

*Reject: ref. to denaturation*

**1**

(iv)    Prevents osmosis / no (net) movement of water / water does not enter organelle / water does not leave organelle;

So organelle / named organelle is not damaged / does not burst / does not shrivel;

*Neutral: ref. to water potential*

***Q*** *Ref. to cells rather than organelles negates the second mark only*

*Reject: ref. to turgid / flaccid for second mark*

*Reject: organelle ‘explodes’ for second mark*

**2**

**[10]**