

**QUESTIONSHEET 1**

- (a) A = nucleus; B = ribosome/RER; C = (RER) vesicle; D = Golgi body; 4
- (b) (i) (nucleus) contains DNA which codes for the enzyme;  
DNA code is transcribed to messenger RNA; 2
- (ii) mRNA attaches to ribosomes;  
code on mRNA translated into the polypeptide; 2
- (iii) polypeptide is transported through cell to Golgi body; (allow 1 mark for 'package the enzyme')  
in vesicle of rough endoplasmic reticulum; 2
- (iv) polypeptides in Golgi body combined/modified to form enzyme;  
carried in Golgi vesicles to cell surface;  
for secretion/exocytosis; max 2
- TOTAL 12**
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**QUESTIONSHEET 2**

- (a) Labels: mitochondrion;  
microvilli/brush border; 2
- (b) microvilli/brush border increases surface area;  
for uptake of glucose/enables greater uptake of glucose/ref to larger amount of carrier protein present; 2
- mitochondria provide ATP;  
for active transport of glucose (into intercellular fluid); 2
- TOTAL 6**
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**QUESTIONSHEET 3**

- (a) (i) autonomic neurone would be non - myelinated; 1
- (ii) sensory neurone would have the cell body attached to the centre of the fibre; 1
- (b) (i) speed up impulse;  
by saltatory conduction;  
electrons/local currents jump from node to node; 3
- (ii) composed of polyribosomes;  
synthesise enzymes involved in transmitter production/recognition proteins for synapse formation;  
eg. synthesis of acetylcholine/noradrenaline/any other correct transmitter substance; 3
- TOTAL 8**

**QUESTIONSHEET 4**

- (a) A = double membrane; B = starch grain; C = granum/grana; D = stroma; E = lipid droplet; 5
- (b) (i) granum/thylakoid membranes/quantosomes; 1
- (ii) stroma; 1
- (c) Any three of:  
 both have double outer membrane/  
 large internal surface area/many internal membranes/  
 contain DNA/ribosomes/  
 contains lipid droplets;;; 3
- (d) (i) in mitochondria catalyses oxidative phosphorylation;  
 in chloroplasts catalyses (cyclic/noncyclic) photophosphorylation; 2
- (ii) enables both to synthesise proteins/polypeptides; 1

**TOTAL 13****QUESTIONSHEET 5**

Description	Process		
	Simple Diffusion	Facilitated Diffusion	Active Transport
Is ATP required		No;	Yes;
Are protein carrier molecules involved?		Yes;	
Direction of transport is down concentration gradient	Yes;		No;

**TOTAL 5**

**QUESTIONSHEET 6**

- A - ribosome manufacture/synthesis of ribosomal RNA;
- B - mitochondria;
- C - increase surface area for attachment of enzymes/for electron transfer chain/oxidative phosphorylation;
- D - lysosomes;
- E - lipid/steroid synthesis/transport;

**TOTAL 5**

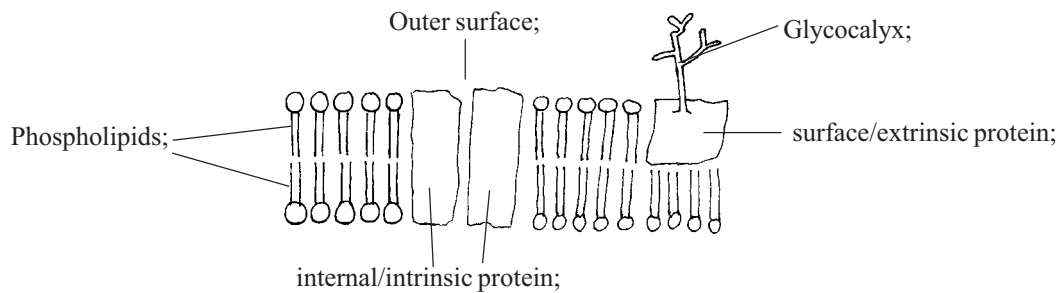
**QUESTIONSHEET 7**

Feature	Bacterial cell	Liver cell	Palisade cell
Nuclear membrane	×	✓	✓
Vacuole	×	×	✓
Cell wall	✓	×	✓
Microvilli	×	✓	×
Chloroplasts	×	×	✓
Mesosomes	✓	×	×
Glycogen granules	✓	✓	×

**TOTAL 7**

**QUESTIONSHEET 8**

- (a) (i) and (ii) correct orientation of phospholipids;  
bilayer;  
correct orientation of protein; 3



- (b) Any two of: transport/ receptors/recognition/ attachment sites/ enzymes;; 2

- (c) (i) diffusion;  
down concentration gradient;  
as hydrogen carbonate ions/as dissolved CO<sub>2</sub>; max 2

- (ii) either: facilitated diffusion;  
glucose binds to carrier/protein;  
protein changes shape/carries glucose across;
- or: active transport;  
glucose binds to carrier/protein;  
energy or ATP required;  
protein changes shape/carries glucose across;  
ref. needs Na<sup>+</sup> to be carried at the same time; max 2

**QUESTIONSHEET 9**

- (a) A = outer membrane; B = inner membrane; C = ribosomes; D = crista; E = DNA; 5
- b) (i) cristae; 2  
 (ii) matrix; 2
- (iii) synthesises proteins/polypeptides;  
 e.g. enzymes; 2
- (b)  $XY = 112 \text{ mm} = 112,000 \mu\text{m}$ ; (this distance may be altered by photocopying- adjust figures accordingly) 2  
 $\frac{112,000}{130,000} = 0.86 \mu\text{m}$ ; 2
- TOTAL 11**
- 

**QUESTIONSHEET 10**

- (a) A. Golgi body; D. double nuclear membrane; 6  
 B. centriole; E. mitchondrion;  
 C. nucleolus; F. rough endoplasmic reticulum;
- (b) (i) Any three of:  
 presence of many mitochondria/  
 large rough ER with ribosomes/  
 presence of microvilli/Golgi body  
 large nucleus;;; 3
- (ii) presence of much smooth endoplasmic reticulum; 1
- TOTAL 10**
- 

**QUESTIONSHEET 11**

- (a) range 7 - 10 nm; 1
- (b) (i) glycocalyx;  
 (ii) intrinsic/integral/internal protein; 3  
 (iii) phospholipid bilayer;
- (c) (i) lipids/proteins can move laterally/change places; 1
- (ii) 1. exocytosis: when material is passed out from the cell using a vesicle;  
 endocytosis: is the uptake of material into the cell by forming a vesicle with the plasma membrane; 2
2. phagocytosis takes solid material into the cell;  
 pinocytosis takes fluid into the cell; 2
- TOTAL 9**

**QUESTIONSHEET 12**

(a) protein;	1
(b) 7.0 –10 nm;	1
(c) shape of receptor site is specific to growth hormone/only growth hormone fits;	1
(d) receptor damaged/mutation affects protein; unable to recognise/bind with growth hormone;	2
<b>TOTAL 5</b>	

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**QUESTIONSHEET 13**

(a) facilitated; rate of transport levels off; when number of solute molecules exceeds number of carriers/proteins;	3
(b) Any two of: concentration gradient/difference/ size/shape of molecule/ polarity of molecule/ temperature;;	2
(c) active transport/use of ATP; sodium/chloride pumps move ions out; cannot re-enter because cell membrane is impermeable to these ions;	3
<b>TOTAL 8</b>	

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**QUESTIONSHEET 14**

(a) (i) A = basement membrane; B = nucleus; C = mucous goblet cell; D = cilia; E = (layer of) mucus;	5
(ii) Any two of: bronchial tree/oviduct/vas deferens;;	2
(iii) D. beat to move material along; beat rhythmically; E. can trap dust/dirt in bronchial tree/ medium for cilia to beat in;	3
b) (i) in a simple epithelium all cells touch the basement membrane; in a compound epithelium there are several cell layers/only the lower cells touch the basement membrane;	2
(ii) transitional; bladder/ureter; stratified/compound squamous; skin/buccal cavity/rectum/vagina;	4
<b>TOTAL 16</b>	

**QUESTIONSHEET 15**

- (a) (i) A = plasma membrane; B = cell wall; C = nuclear mass; D = mesosome; E = ribosomes; **5**
- (ii) contain the enzymes for respiration/cell wall synthesis; **1**
- (iii) coccus; **1**
- (b) prokaryotic cells contain no membrane-bound organelles, eukaryotes do;  
 prokaryote cells have no nuclear membrane, eukaryotes do/prokaryotes have a nuclear mass;  
 eukaryotes have a nucleus/prokaryotes have one long chromosome, eukaryotes have many chromosomes;  
 prokaryotes have no nucleoli, eukaryotes do;  
 prokaryotic cell walls contain murein, eukaryotic cell walls (if present) contain cellulose;  
 prokaryotes contain 70S ribosomes, eukaryotes contain 80S ribosomes; **max 3**

**TOTAL 10****QUESTIONSHEET 16**

- (a) (i) A = xylem; B/C = phloem; **2**
- (ii) A = vessel; B = companion cell; C = sieve tube; **3**
- (iii) D = sieve plate; **1**
- (b) (i) no contents/hollow to allow easy passage of water/salts;  
 no end cell walls so no blockage to passage of water/salts;  
 pits in wall allow lateral passage of water/salts;  
 lignified wall gives strength to support the plant/prevent collapse of vessel when under transpiration pull; **max 3**
- (ii) B has a nucleus, C does not;  
 B has dense cytoplasm, C has peripheral cytoplasm (or equivalent)/C has a vacuole/B does not;  
 C has a sieve plate, B does not; **max 2**
- (c) length between lines = 51 mm (allow range 50.5 - 51.5);
- $$\frac{51}{750} ; \quad (\text{this distance may be altered by photocopying- adjust figures accordingly})$$
- $$= 0.068 \text{ mm}; \quad \mathbf{3}$$
- (0.067 mm - 0.069 mm) (allow consequential error if length measured incorrectly)

**TOTAL 14**

**QUESTIONSHEET 17**

(a)	(i)	parenchyma;	1
	(ii)	packing tissue/supporting tissue/storage tissue;	1
	(iii)	isodiametric cells; allows tight packing; thin cell wall; transmission of turgidity/vacuole allows development of turgidity; contains starch grains;	max 3
(b)	(i)	phloem;	1
	(ii)	A = sieve tube; B = companion cell; C = sieve plate;	3
	(iii)	transport of organic solutes/amino-acids/sugars/equivalent;	1
	(iv)	sieve plate has perforations (to allow passage of solutes); plasmodesmata pass through sieve plate from cell to cell; sieve tubes elongated for easier transport; sieve tubes lose nucleus/most organelles, so transport easier through cytoplasm; companion cell regulates action of sieve tubes;	max 3
			<b>TOTAL 13</b>

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**QUESTIONSHEET 18**

(a)	(i)	A = <u>rough</u> endoplasmic reticulum; B = vesicles <u>from rough ER</u> (not Golgi vesicles); C = Golgi body; D = plasma/cell membrane;	4
	(ii)	to transport polypeptides/proteins from the rough ER to the Golgi body;	1
	(iii)	it assembles polypeptides into proteins; may combine the protein with lipid/carbohydrate/nucleic acid/metal ions/any correct example; to synthesise enzymes/some hormones/mucus/other correct example; packages secretion into vesicles and releases these to the cytoplasm;	max 3
(b)	(i)	plasma cell/lymphocyte; antibodies;	2
	(ii)	HCl in gastric juice/sweat/sebum/named hormone/any valid example; oxyntic cell/stomach cell/sweat gland cell/sebaceous gland cell/correct endocrine cell/cell must be appropriate to the example;	2
	(iii)	the stored secretion may be an enzyme or hormone which could adversely affect the cell if free (in the cytoplasm); thus it is isolated within a phospholipid membrane;	2
	(iv)	stimulation by a hormone/nerve impulse;	1
			<b>TOTAL 15</b>

**QUESTIONSHEET 19**

- (a) (i) A = rough endoplasmic reticulum; B = vesicles from rough ER;  
C = Golgi apparatus/body; D = mitochondrion; 4
- (ii) contain digestive/hydrolytic enzymes;  
eg. protease/peroxidase/acid phosphatase;  
keep the enzymes in membranes, thus segregated from the cytoplasm/prevent enzymes from damaging the cytoplasm;  
concerned with digesting/recycling phagocytosed material/aged organelles; max 3
- (iii) receives polypeptides from rough ER via vesicles;  
assembles them into enzymes;  
packages them in lipoprotein membrane;  
'buds' them off as primary lysosomes; max 3
- (b) (i) primary lysosome has budded off from Golgi body and is unmodified;  
secondary lysosome is formed when the primary lysosome fuses with an autophagic vesicle/phagosome; 2
- (ii) an autophagic vesicle will absorb an aged organelle/mitochondrion;  
when fused with the primary lysosome the aged organelle will be broken down/recycled; 2
- a phagosome takes in solid material by phagocytosis/engulfing;  
the solid material is broken down when the phagosome fuses with a primary lysosome; 2
- the residual body contains the remains of the digested organelle/phagocytosed material;  
will return products of digestion/amino acids to the cytoplasm for reuse; 2
- TOTAL 18**
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**QUESTIONSHEET 20**

- (a) (i) increases surface area/value of A;  
if A is increased then J is increased;  
thus more absorption per unit time; 3
- (ii) (if membrane is thin)  $\Delta x$  is small;  
thus J is large;  
thus more absorption per unit time; 3
- (b) (i) provide ATP;  
for active transport;  
to maintain/work against concentration gradient; 3
- (ii) ref. cholesterol will mix with water and allows passage of some water soluble substances;  
will accelerate diffusion/entry of non-polar substances;  
e.g. oxygen/carbon dioxide; max 2

**TOTAL 11**