

| Question          | E Answers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Marks   | Additional Guidance     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------|
| 1 (a)             | <b>A</b> – cell wall ;<br><b>B</b> – cytoplasm ;<br><b>C</b> – vacuole ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [3]     |                         |
| (b)               | <i>NB paired marking points</i><br><i>1<sup>st</sup> point of each pair can be free standing</i><br><i>2<sup>nd</sup> marking point must be linked correctly</i><br><br>large surface area ;<br>to maximise absorption / AW ;<br><br>membrane with, carriers / proteins ;<br>for active transport (of ions) ;<br><br>vacuole with high concentration of, salts / sugars / solutes ;<br>to give, low(er) water potential / water potential gradient ;<br><b>A</b> promotes osmosis<br><br><u>thin</u> cell wall ;<br>short distance for diffusion ;<br><br>(more) mitochondria ;<br>to provide, energy / ATP, + for active transport ; | [2 + 2] | <b>R</b> produce energy |
| (c)               | produced by photosynthesis (in leaves) ;<br>from breakdown of starch stores ;<br><u>translocation</u> ;<br>in the phloem ;<br>as sucrose ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | [max 2] |                         |
| <b>[Total: 9]</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                         |

2 (a) *assume answer is about plant cells unless told otherwise, allow reverse argument*

(large / sap) vacuole ; **A** 'animal cell has small vacuoles' **R** sap unqualified  
chloroplasts ; **R** chlorophyll  
(cellulose) cell wall ;  
starch grain(s) ; **R** starch unqualified

[max. 2]

(b) **B** ;  
**E** ;  
**F** ;  
**A** ;  
**D** ;

[5]

(ii) *award two marks if correct answer (x 990 to 1010) is given, ignore units*

*ecf – award one mark if incorrect measurement or 10 cm is divided by 0.1  
if answer is correct put two ticks on answer  
if answer is incorrect but the denominator is 0.1, place a tick on the working*

100 / 0.1 ; **A** 99 - 101  
= (x) 1000 ; **A** 990 - 1010

[2]

(c) *do not award the function mark unless the cell name is correct*

(animal cell) red blood cell / erythrocyte ;  
(function) transports, oxygen / carbon dioxide ; *haemoglobin is neutral*

**either**

(plant cell) xylem (cell / vessel) ;  
(function) transports, water / minerals / named mineral / AW ; **A** provides support

**or**

(plant cell) phloem (cell) ; **A** sieve tube **R** companion cell  
(function) transports, sugars / sucrose / amino acids / minerals / AW ;  
*ignore water* **R** glucose / nutrients

[4]

[Total: 13]

3 (a) CHECK FIG. 1.1 FOR ANSWERS

- C (Clethrionomys glareolus) ;
- D (Oryctolagus cuniculus) ;
- E (Sciurus caroliniensis) ;
- A (Sorex araneus) ;
- B (Talpa europaea) ;

**max. 4**

Bracket the first two answers together for the first tick

- (b) ref. to presence of fur / hair ;  
ref. to mammary gland / breast / udders / nipples / breast feeding /  
production of milk (to feed young) / suckling ;  
ref. to external ears / presence of pinna ; **A** description

**max. 2**

**total max. 6**

- 4 (a) (i) gut / alimentary canal / oesophagus / small intestine / ileum / duodenum / large (A big) intestine / colon / rectum / intestine / AW ; stomach [1]
- (ii) hepatic portal vein ; A hepatic R HPV [1]
- (b) (i) *answers may be in space below question*  
A – nucleus ;  
B – cell / plasma, membrane ; A plasmalemma  
C – cytoplasm ; [3]
- (ii) *award two marks if correct answer (between 1983 – 2017) is given, ignore units*  
*award one mark if incorrect measurement is divided by 0.06*  
*allow +/- 1 mm in reading the line*
- 120 (mm) / 0.06 (mm) 12 (cm) / 0.006 (cm)  
2000 ;; A 1983 – 2017 [2]

4 (c) award in either section

- 1 ref to enzymes (within liver cells) ;
- 2 ref to negative feedback / homeostasis ;  
A 'concentration returns to normal' / 'reduces glucose level' / AW

*penalise once if insulin / glucagon are described as acting like enzymes – MP5/7*

*ignore incorrect source of hormone(s)*

*penalise once if starch is given instead of glycogen and if glycogen is misspelt*

*blood glucose concentration is higher than normal*

- 3 insulin ;
- 4 glucose, enters / diffuses into / goes into / absorbed (by liver / cells) ;
- 5 (liver cells) store glucose as glycogen / convert glucose to glycogen ;  
A increase respiration / increase metabolism of glucose / storage of fat / AW

*blood glucose concentration is lower than normal*

- 6 glucagon ;
- 7 (liver cells) convert / break down, glycogen to form glucose ;
- 8 glucose, goes out of cells / enters the blood ;

[5 max]

- (d)
- 1 makes (named) protein / protein synthesis / forms peptide bonds / are assimilated ;
  - 2 (excess are) broken down / deaminated ;
  - 3 removal of, amino group /  $-NH_2$  / nitrogen-containing part ; R nitrogen unqualified
  - 4 (to form) ammonia ;
  - 5 converted to urea ; A amino acids are, broken down / converted, to urea
  - 6 rest of molecule (A carbohydrate), is respired / used to provide energy / stored ;
  - 7 transamination / described ;

[3 max]

[Total: 15]

5 (a) (i) chloroplasts ; **R** chlorophyll  
cellulose cell wall ; **A** 'not made of, murein / peptidoglycan'  
(sap / large / permanent) vacuole(s) ; **A** tonoplast  
nucleus / nuclear membrane / nuclear envelope ; **R** DNA / RNA  
nucleolus ;  
mitochondria ;  
endoplasmic reticulum / Golgi ;  
amyloplasts ; **A** starch, grains / granules  
more than one chromosome / linear chromosome(s) ; [4]

(ii) membrane ;  
cytoplasm ;  
ribosomes ;  
chromosomes ; **A** 'strands of DNA' **R** DNA unqualified  
glycogen granules ;  
oil droplets ; [max 2]

|                                                                                                                                                                   |                                                                                                                    |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------|
| <p>(b) cheese ;<br/> yoghurt ;<br/> sour milk ;<br/> bread ;<br/> alcohol / any named alcoholic drink ;<br/> Quorn / mycoprotein ;<br/> single cell protein ;</p> | <p>tofu ;<br/> soya sauce ;<br/> sauerkraut ;<br/> vinegar ;<br/> tapai ;<br/> tempe / tempeh ;<br/> kimchee ;</p> | <p>[max 2]</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------|

(c) *reject bacteria becoming immune and antibiotics causing mutation*

- 1 mutation / mutant ;
- 2 stronger wall / less permeable wall / enzyme to breakdown antibiotic / AW ;
- 3 antibiotic kills bacteria except those that are , mutant / resistant ;
- 4 antibiotic is, selective agent / AW ; **A** ref to (natural) selection
- 5 (resistant) bacteria reproduce ; *ignore mitosis* [max 3]

(d) *this may be answered with reference to insulin*

- 1 fast reproduction rate / AW ;
- 2 identical offspring / cloning ;
- 3 small number of genes ;
- 4 single cells ;
- 5 copy / use, genes from, other organisms / viruses ;
- 6 makes, protein / named protein, from another organism ;
- 7 have plasmids ;
- 8 used to transfer gene(s) into bacteria / easy to put gene(s) in bacteria ;  
**A** DNA for gene  
**R** product / protein, taken from, human / other organism [max 2]

**[Total: 13]**