

BIOLOGY - BY1

No. **Answer** **Mark**

1.

Feature	Prokaryotic	Eukaryotic
mitochondria	Absent (not: no organelles)	present;
Arrangement of DNA	circular/no chromosomes; (not: loop)	DNA forms chromosomes
Position of DNA	Free in cytoplasm	in nucleus/ bound by membrane;
Composition of cell wall if present	murein peptidoglycan (not: not cellulose)	cellulose/chitin;
Size of ribosomes	Small/70S; (not: other figures)	Large/80S;

1 mark per row

(Total 5 marks)

2. (a) capable of immobilisation/ fixed to inert matrix or named;
Stable/able to withstand changes in temperature or pH;
specific to test or substrate;
(not: ref. turn over number) **2 max**
- (b) allows glucose through; (not: ref. small molecules)
prevents passage of other molecules/solutes
(not: ref. substances) **2**
- (c) glucose broken down by enzyme;
Products/oxygen affect/detected by electrode;
(not: measured by)
electric signal generated/chemical to electrical;
greater conc. glucose the greater the signal; **2 max**
- (d) enzyme activity/ rate of diffusion of glucose affected;
change rate of reaction;
unreliable result;
(not: ref. enzyme denaturation/fair experiment/control/false reading/confidence) **2 max**

(Total 8 marks)

3. (a) (i) fluid mosaic model;
mosaic of protein molecules/irregularly or randomly
arranged;
lipid layer fluid/can move; **3**
- (ii) A = phospholipid bilayer/fatty acid tails; (not: ref.
hydrophobic)
B = extrinsic/surface protein/glycoprotein;
C = transmembrane/carrier/intrinsic protein; **3**
- (iii) allows passage of polar/charged/ionic/hydrophilic
molecules/facilitated diffusion; (allow: ref. water/non lipid
soluble; not: named molecule) **1**
- (b) movement up/against a concentration gradient;
requires energy/ATP; **2**
- (c) maintain water potential;
obtain nutrients/metabolites or named e.g. glucose;
obtain oxygen/remove carbon dioxide;
secrete molecules;
remove toxic substances or named;
(not: waste products) **2 max**
- (Total 11 marks)**

4. (a) 11.6 cm³ min⁻¹;
(allow: 5.8/30 x 60) correct answer + units =2;
correct answer - units =1; incorrect answer, correct working = 1 2
- (b) Maximum/higher concentration of substrate;
all active sites occupied;
(not: ref. unoccupied at start) 2
- (c) (i) increase in rate from 20 - 100°C/up to 100°C;
fall from 100 - 130°C;
increase in kinetic energy;
molecules move faster; (not: more)
More successful collisions/more enzyme-substrate complexes formed;
up to optimum; (not: 100°C unqualified)
above optimum increased vibrations;
hydrogen bonds break;
Loss/change of shape of active site; (not: ref. enzyme)
denature; 6 max
- (ii) enzymes have different optimum temperatures/
human amylase has optimum of 37°C, bacterial 100°C; 1
human amylase denatures at a lower temperature; 1
- (Total 12 marks)**
5. (a) (i) amino acid;
triglyceride; (not: lipid/triglycerol) 2
- (ii) nitrogen/sulphur; (not: chemical symbols) 1
- (b) condensation;
peptide; 2
- (c) (i) add Biuret to test solution; (not: if ref. to boiling) 1
blue changing to mauve/purple colour is positive result; 1
- (ii) little colour change/mauve colour may be masked; 1
- (Total 8 marks)**

6. (a) A = matrix;
B = crista/internal membrane; 2
- (b) E is the site of protein synthesis;
Polypeptide chains build up at ribosome;
transports polypeptides/proteins;
ribosomes read genetic code (allow: receive mRNA); 2 max
- F buds off vesicles/package proteins into vesicles;
these contain molecules for secretion;
transport protein molecules to cell surface/membrane;
synthesis of glycoproteins/modification of proteins; 2 max
- (c) secretory cell involved in active processes/metabolically active;
ATP/energy dependent;
ATP manufactured by C;
hormone synthesis requires ATP; 2 max
- (d) cut in different plane/AW; 1
- (Total 9 marks)**
7. (a) cell/plasma membrane; 1
- (b) 50% of cells plasmolysed/point of incipient plasmolysis/membrane just in contact with wall/at incipient plasmolysis $\Psi P=0\text{KPa}$;
because cell left in solution for one hour;
equilibrium reached/no net movement of water;
solute potential inside equal to that outside;
outside solution is given as -600kPa ; 3 max
- (c) K is cell wall which is inelastic/won't stretch;
as protoplast/cell contents expand/swell; (not: ref. vacuole unqualified)
as water passes into cell;
pushes against expanding protoplast/cytoplasm/cell contents;
pressure potential is generated by resistance of cell wall; 3 max
- (Total 7 marks)**

- 8. (a) (i)**
- A daughter cells exact copies/genetically identical cells;
 - B same number of chromosomes as parents;
 - C genetic stability;
 - D important for growth;
 - E replacement of missing tissue/parts;
 - F repair to wounds/(damaged) tissue/cell replacement plus e.g. skin/hair/gut lining/blood cells;
 - G asexual reproduction plus e.g. bulbs tubers runners/used by bacteria/yeast;
 - H allows large numbers of offspring to be produced/ref. cloning/quick colonisation;
 - I ref. to cancer i.e. proliferation of cells; **6**
- (ii)**
- J haploid vs. diploid/mitosis maintains chromosome numbers, meiosis halves it; (not: just 23 vs 46)
 - K two divisions involved;
 - L chromosomes are different/crossing over occurs; (allow: ref. independent assortment)
 - M meiosis produces gametes; (allow: examples e.g. sperm and egg cells; not: sex cells)
 - N allows for variation;
 - O allows sexual reproduction to take place; **4**
- 10**
- (b)**
- A polynucleotide/chain of nucleotides;
 - B nucleotide consists of phosphate, sugar plus base;
 - C sugar is deoxyribose;
 - D base contains nitrogen; (allow: ref. nitrogenous)
 - E four bases are adenine, guanine, cytosine and thymine; (not: letters/ref. uracil)
 - F sugar phosphate backbone;
 - G two polynucleotide chains linked;
 - H antiparallel (stated, in context);
 - I ref. polynucleotide chains/base pairs held together by hydrogen bonds;
 - J complementary base pairing;
 - K A-T, G-C;
 - L pairing of purines and pyrimidines;
 - M double helix;
 - N purines double ring and pyrimidines are single ring;
 - O ref. sequence of bases is genetic code; **10**