GCE BIOLOGY BY1

Question			Marking details	Marks Available
1.	(a)	(i)	A <u>amino/amine</u> ; B <u>carboxyl</u>;	2
		(ii)	variable group/side chain OR description of; NOT element/ hydrocarbon chain/ R group	1
	(b)	(i)	Dipeptide; NOT polypeptide	1
		(ii)	peptide (bond);	1
	(c)	(i)	hydrogen bonds; NOT H bond	1
		(ii)	**Alpha/ α** helix; NOT double helix	1
		(iii)	secondary/ 2° (structure) NOT second	1
			Question 1 total	**[8]**

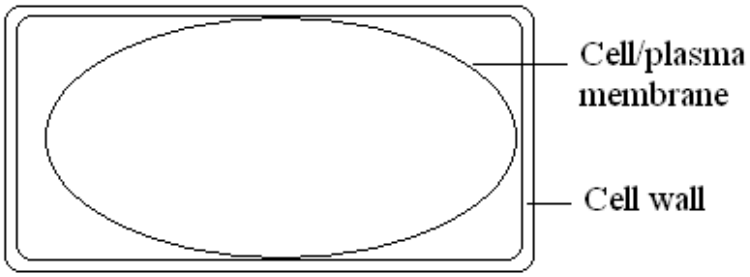
Question			Marking details	Marks Available
2.	(a)	(i)	Lock and key;	1
		(ii)	Theory 1/ induced fit;	1
	(b)		Enzyme substrate complex; NOT ESC/ ES complex	1
	(c)		Lower the <u>activation</u> energy/eq;	1
	(d)		Enzyme/ active site is unchanged/can be re-used; NOT active sites are a specific shape unqualified	1
	(e)		Temperature (not heat); pH; NOT acidity Enzyme concentration; Substrate concentration; NOT amount	3
	(f)		Intracellular: inside the <u>cell</u> + Extracellular:outside the <u>cell</u>; NOT inside body	1
			Question 2 total	**[9]**

Question			Marking details	Marks Available
3.	(a)	(i)	A Mitochondrion/ mitochondria **Plus** ATP synthesis/aerobic respiration; NOT produce/ create energy B Golgi Body/ complex/ apparatus NOT golgi alone **Plus one of** • Modification of {proteins/lipids}/ Addition of sugar chains/ produces glycoprotein • {Transport/storage} of {lipids/digestive enzymes} • Synthesis of {(secretory) vesicles/lysosomes}/ packaging proteins; NOT transport(ation) of proteins/ synthesis of proteins	2
		(ii)	Liver/muscle/nervous tissue/ meristem;	1
	(b)		Nuclear pores + Allows {mRNA/ribosomal RNA/ribosomes} to <u>pass out/through</u> of nucleus; NOT substances Nucleolus + Synthesis of ribosome (components); (Double) nuclear membrane/nuclear envelope + Separates the DNA from the rest of the cellular contents/ holds DNA/ chromosomes; Chromatin+ condenses to form chromosomes/ {involved in/ code for} protein synthesis; **Matched pair = 1 mark**	2
	(c)		D presence of ribosomes **+** no ribosomes on E; D {<u>membranes/ cisternae</u>} in parallel/regular lines/ more organised **+** {open network of <u>membranes/ cisternae</u>}/ less organised/ or description in E;	2
			Question 3 Total	**[7]**

Question			Marking details	Marks Available
4.	(a)		Root tip/ shoot tip/ meristem;	1
	(b)		A Anaphase; B Prophase; C Telophase; D Metaphase;	4
	(c)		Interphase; It is the longest phase;	2
	(d)		(All cells) would be {haploid/half the number of chromosomes}; NOT cells have fewer/ less chromosomes (All cells) would be **genetically** different;	2
			Question 4 Total	**[9]**

Question			Marking details	Marks Available
5.	(a)	(i)	<u>two layers/ double layer</u> of <u>phospholipids</u>; NOT bilayer	1
		(ii)	<u>fatty acid</u>;	1
		(iii)	Any 2 from: transport/ form hydrophilic pores/ active transport/ channel proteins/ facilitated diffusion; receptors/ cell recognition; enzyme systems;	2 max
	(b)		Decreased fluidity/ rigid membrane - cells/ membranes more easily damaged (as blood flows)/ cannot pass through capillaries so easily; Membrane proteins change shape / denatured {carriers/ receptors/membrane enzymes} - so {reduced/no} {transport/movement} of molecules;	2
	(c)		Any 2 from: {Unrestricted/ uncontrolled} {Cell division/mitosis}; Forming a mass of cells/ tumour; Preventing {normal cells/ organs} from functioning;	2 max
			Question 5 Total	**[8]**

Question			Marking details	Marks Available
6.	(a)		Causes change in <u>shape</u> of enzyme/active site; So substrate no longer fits into active site; {No/ fewer} enzyme substrate complexes;	2 max
	(b)		{(Insoluble) enzymes/ (enzyme) aggregates} cannot pass through the filter/ ORA; So the product is uncontaminated with enzymes/ ORA;	2
	(c)		Can tolerate {<u>higher</u> temperatures/greater <u>range</u> of pHs}; NOT range of temperatures Easily <u>recovered</u> for reuse/ enzymes stay in aggregates/ reused qualified/ uncontaminated product/ separated from product; NOT reused unqualified/ enzymes reused Several enzymes can be used together; Easy addition/removal of enzymes;	3 max
	(d)		Any one from : Gel capsule/alginate beads/ gel beads; cellulose fibres; gel membrane; porous glass beads; NOT inert matrix unqualified/ encapsulation unqualified	1 max
			Question 6 Total	**[8]**

Question			Marking details	Marks Available
7.	(a)	(i)	{0.0M/distilled water} increase in mass **and** {1.0M/ sucrose solution} decrease in mass;	1
		(ii)	Turgid;	1
		(iii)	Water moves out of the {cell/ potato}; By **osmosis**; The external solution has a {lower water potential than the cell/is hypertonic/ more negative}/ ORA ; Potato becomes flaccid/cells are plasmolysed;	3 max
		(iv)	Isotonic;	1
		(v)	1. Where the line crosses the {X/ horizontal axis} there is no change in {mass/weight}; 2. So $\psi_{cell} = \psi_{external}$ solution (can be expressed in words); 3. This is 0.3(M) sucrose; (must be linked to point 1 or 2) 4. And converts to -860kPa from the (conversion) table; 5. (So ψ_{cell} potato) = **-**860kPa;	3 max
	(b)		 • 1 mark for correct drawing of a plasmolysed plant cell(at any stage); (cell wall must be double line) • 1mark for correct labelling of a plasmolysed plant cell (plasma membrane pulled away from cell wall – both labelled correctly/ accurately);	2
			Question 7 Total	**[11]**

Question			Marking details	Marks Available
8.	(a)		A. Monosaccharides / single sugars plus 2 suitable examples; B. Diagram of hexose/glucose; C. Alpha and beta forms of glucose shown; (can be description) D. Pentoses/deoxyribose/ribose and presence in DNA/RNA; E. Trioses in photosynthesis/respiration/metabolic pathways; F. Disaccharides plus 2 suitable examples; G. Correct formation of glycosidic bond (stated or diagrams, labelled); H. 2 suitable examples of where disaccharides are found (milk sugar/germinating seeds/transport in plant stems); I. Starch in plant cells for storage of <u>glucose</u>; NOT energy J. Correct reference to starch structure (alpha glucose/amylose & amylopectin/1 -4 and 1 – 6 linkages/amylose spiral chain/amylopectin branched); K. Glycogen in <u>animal</u> cells for <u>glucose</u> storage ; L. Glycogen has branched chains; M. Cellulose in <u>plant</u> cell walls/structural polysaccharide; N. Correct reference to cellulose structure (beta glucose/microfibrils/ chains held together by H – bonds/alternate 180^{o} glucose); O. Correct reference to chitin (amino groups/ use in {exoskeleton/ fungal cell walls})	

Question			Marking details	Marks Available
	(b)		A. Ref to DNA **and** RNA; B. Diagram/description of a nucleotide with correct labels/terms (phosphate & pentose sugar & nitrogenous/eq base); C. DNA named sugar Deoxyribose; must link to DNA D. Ref to purines and pyrimidines; E. Correct identification of purines and pyrimidines (Full names only); F. Ref to Uracil replacing thymine in RNA; G. Correct base pairing A-T, C-G (*Allow letters;allow from diagram)* H. Description/labelled diagram of <u>double</u> helix in DNA; I. Held together by H – bonding; J. Functions of DNA (i) replication in dividing cells; K. (ii) code/ template for protein synthesis; L. Description of RNA as a single chain/ strand (of nucleotides); NOT single helix M. Ref correct sugar Ribose in RNA; correctly linked N. mRNA carries genetic code from the nucleus to the ribosome; O. correct reference to tRNA/ribosomal RNA; **Question 8 Total**	**[10]**