Biology BY1

Question			Mark Scheme
1			3

Feature	Bacterium	Virus
Possess nucleic acid	✓	✓
Surrounded by a protein coat	X	✓
Ribosomes in cytoplasm	✓	X

(not: hybrid ticks ✓✗)

2	(a)	(i) Fibrous;	1
		(ii) Polypeptide chains; (not: proteins) Three chains; (not: strands) (Three) alpha helices; Tightly/closely bound; Held together by hydrogen bonds:	(3 max)
		(iii) Structural/relevant example e.g. tendons or named tissue strengthened. (not: strength or name of tissue unqual./tensile strength)	1
	(b)	(i) Four chains vs. three; Iron/prosthetic/haem group vs. none; Compact vs. non-compact/long fibres vs spherical; 3 polypeptide chains the same vs 2 different polypeptide chains; Secondary structure vs. quaternary structure: (not: more complex)	(3 max)
		(ii) Hormones/enzyme/ antibodies/plasma proteins. (not: specific examples)	1

9 MARKS

Question				Mark Scheme
3	(a)	(i)	At higher temperature/60^{o} enzyme/substrate has more kinetic energy/vibrates more; (not: ref. movement) More Enzyme substrate complexes formed/ more <u>successful</u> collisions; More product formed/greater rate of reaction.	3
		(ii)	At 60ºC enzyme reacts rapidly; (Gradual) denaturation of enzyme occurs or description; All substrate not reacted;	3
	(b)		All substrate converted to product. (not: active sites full)	1
	(c)		Lower temperature, less kinetic energy/fewer vibrations; Fewer enzyme substrate complexes formed/fewer <u>successful</u> collisions; Some substrate remains after 60 minutes; (not: reaction has not ended) Maximum product formation not yet achieved.	(3 max)

10 MARKS

Question				Mark Scheme
4	(a)	(i)	Can be re-used; Greater stability; Despite variations in temperature/pH; Easy to remove product/product not contaminated with enzyme; More than 1 enzyme can be used/enzymes added or removed easily. Can be used in a continuous production system	(2 max)
		(ii)	Colour change only/can only indicate if its present or absent; Subjective nature of judgement of colour/qualitative rather than quantitative.	2
	(b)	(i)	Measures metabolite/named substance; By converting chemical signal/energy into an electrical signal/energy.	2
		(ii)	Combines with substrate/glucose; At active site; To produce product.	(2 max)
		(iii)	Glucose from blood diffuses into gel; Acted on by glucose oxidase; Amount of product released proportional to glucose concentration; Electrode activated by product; Generates electrical potential/signal; Size of potential directly proportional to mass of product.	(4 max)

12 MARKS

Question				Mark Scheme
5	(a)	**Cell X**	**Cell Y**	(3 max)
		Large number of vesicles	No/small number vesicles;	
		(not: lysosomes)		
		Large amount of RER/ribosomes	Little RER/ribosomes;	
		Few mitochondria	Large number of mitochondria;	
		No microvilli	Microvilli; (not: villi /membrane folds)	
		More nuclear pores	Fewer nuclear pores.	
		(not: ref. cell size)		
	(b)	A = Transport substances to plasma/cell membrane;		3
		B = Protein synthesis;		
		C = ATP synthesis (not: produce energy/ref. respiration).		
	(c)	Exocytosis;		(2 max)
		Transport vesicle fuses with plasma membrane;		
		Break in membrane to allow expulsion of secretion.		
				8 MARKS

Question				Mark Scheme
6	(a)	Mitochondrion.		1
	(b)	(i)	Advantage: *Higher energy yield <u>per unit mass</u>/higher yield <u>per g</u>. Disadvantage: More oxygen required for respiration.	2
		(ii)	Heat/thermal/electrical insulation; (not: insulation unqual.) *Better source of metabolic water; Buoyancy; Protection against knocks (not: protection unqual.) (points marked * are interchangeable and could be credited in either (i) or (ii) but not credited in both)	(2 max)
	(c)	(i)	New tissue manufacture/growth qualified/repair; Enzyme manufacture.	2
		(ii)	Breaking a bond; (not: molecule broken down) Insertion of a molecule of water/chemical addition of water (not: adding water)	2
		(iii)	Glucose; (not: beta glucose) Amino acids.	2

11 MARKS

Question				Mark Scheme
7	(a)	(i)	Blood clots/infection.	1
		(ii)	Water has highest water potential/0 compared with -476/-896kPa; Water passes down water potential gradient/from high to low water potential; Passes into cell by osmosis. (not: ref. water concentration)	3
	(b)		Diagram showing <u>crinkled</u> cells; (not: showing plant cell or nucleus) Higher water potential inside cell; Water passes out of cell (causing shrinkage/distortion).	3
				7 MARKS

Question				Mark Scheme
8	(a)	A	Interphase, replication of DNA; (not: DNA doubles)	
		B	Also replication of organelles;	
		C	Synthesis of rRNA/proteins/ATP; (not: metabolic activity)	
		D	Prophase chromosomes appear as two chromatids/ ref, condensation;	
		E	Joined at centromere;	
		F	Nuclear membrane disappears;	
		G	Chromosomes line up at equator during metaphase;	
		H	Spindle formation;	
		I	Centromere divides at anaphase;	
		J	Chromatids/chromosomes to opposite poles at anaphase;	
		K	Contraction/shortening of spindle fibres;	
		L	Nuclear membrane reforms during telophase;	
		M	Cytokinesis/cell division occurs by furrowing of membrane/cleavage;	
		N	Cytoplasm splits/divides;	
		O	Centrioles replicate / move to poles.	
			Note: ref. to each event must take place in correct stage	
				10 MARKS

Question				Mark Scheme
8	(b)	A	Both contain the elements CHON;	
		B	Both can link to form larger molecules/polymers/ref. monomers;	
		C	Nucleotides consist of nitrogenous base;	
		D	plus pentose and phosphate; (not: 5C sugar)	
		E	bases are pyrimidines and purines;	
		F	Amino acids possess an amine/NH_2 group/carboxylic group;	
		G	Variable R group;	
		H	More/20 types of amino acid;	
		I	Amino acids link together by peptide bond formation/sugar phosphate backbone;	
		J	Five different bases in nucleotides/5 named; (not: letters only)	
		K	Bases can undergo complementary base pairing;	
		L	Adenine with thymine or uracil and guanine with cytosine;	
		M	By hydrogen bonds;	
		N	Nucleotides carry genetic information;	
		O	Sulphur containing vs. phosphate containing.	
				10 MARKS