



BIOLOGY MIND

Edexcel

A-Level

BIOLOGY

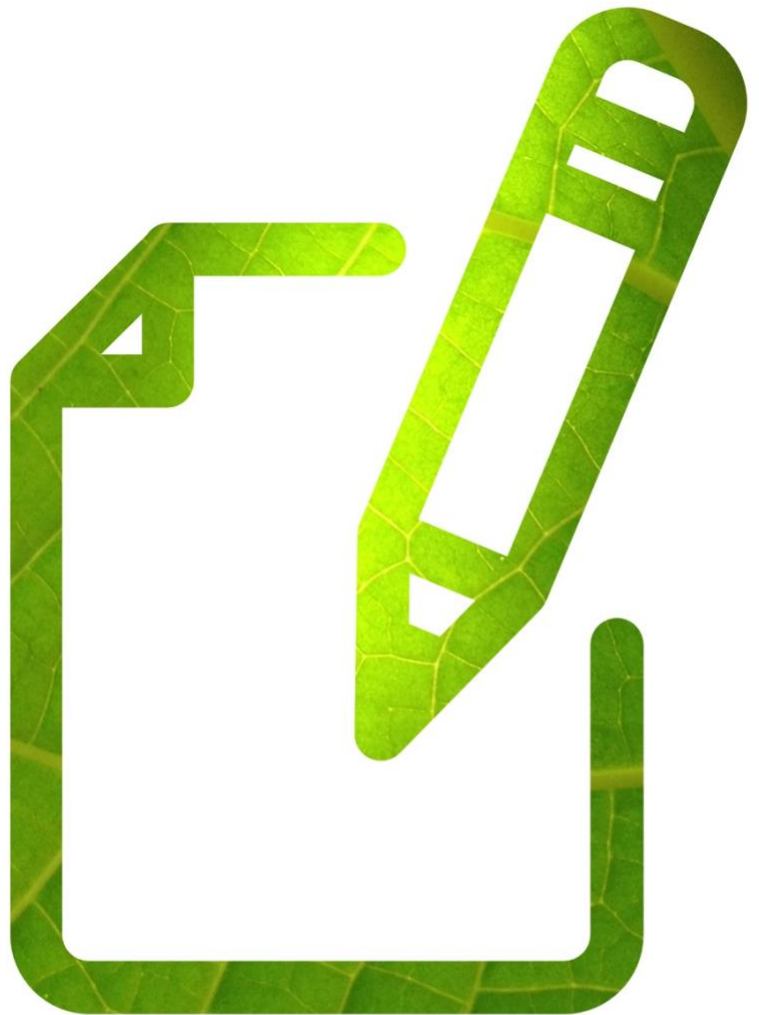
Biological Molecules

DNA & Protein Synthesis 7

Time allowed

65 minutes

MARK SCHEME



Score

/54

Percentage

%

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	1. (skin flora) {prevent growth of / kill} {pathogens / microorganisms / bacteria / eq} ; 2. competition for {space / nutrients / water / minerals / eq} ; 3. release of {chemicals / toxins / antimicrobials / lipids / enzymes /eq } ;	1 ACCEPT prevent colonisation IGNORE antigens / viruses / infections / diseases 2 IGNORE food / resources 3 NOT sebum / lysozymes	(2)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	B they have antimicrobial properties that inhibit the growth of bacteria		(1)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	C keratin		(1)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. idea of little {tertiary / quaternary } structure / eq OR mainly secondary structure ; 2. made up of {long / linear / straight / eq} {molecules / (poly)peptides / polymers } ; 3. idea of cross-linking (between one polypeptide chain and another) ; 4. idea of repeating amino acid sequences / eq ; 5. insoluble / eq ; 6. tough / strong / eq ;	3 NOT peptide bonds 5 IGNORE hydrophobic on outside	(4)





DNA & Protein Synthesis

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	1. {DNA / (m)RNA} contains the {genetic code / triplet codons / base sequence coding for amino acids / eq}; DNA : 2. idea that the DNA strand is used {in transcription / to make (m)RNA / eq} ; mRNA : 3. (m)RNA is a copy of the DNA ; 4. mRNA carries this {information / code /eq} {out of the nucleus / to the ribosomes / eq} ; 5. idea that amino acids {arranged in sequence / eq } ;	1 ACCEPT (DNA) template 4 IGNORE to cytoplasm	(4)





DNA & Protein Synthesis

Question Number	Answer	Mark
2 (a)	1. idea of half the number of chromosomes found in a {normal body cell/somatic cell / eq} ; 2. idea of containing one chromosome from each homologous pair; 3. the type of nucleus found in {gametes / sex cells / eq} ; 4. a nucleus is (an organelle / (double) membrane-bound structure / eq) ;	(2)

Question Number	Answer	Mark
2 (b)	1. idea that pH increases then decreases; 2. correct manipulation of figures in an appropriate context e.g. overall 0.2 change / eq ;	(2)



Question Number	Answer	Mark
* 2 (c) QWC	Take into account quality of written communication when awarding the following points. 1. idea of amino acids transported to rER e.g. tRNA {binding to/ transporting} amino acids (in cytoplasm) ; 2. reference to involvement of ribosomes ; 3. amino acids {being joined by peptide bonds / forming polypeptide chains / forming primary structure of protein / eq} ; 4. {folded into 3-D shape / secondary or tertiary structure} in rER ; 5. packaged into vesicles at the end of the rER / eq ; 6. vesicles {move to / transported to / fuse with / eq} the Golgi apparatus ; 7. idea that protein modified in Golgi apparatus ; 8. (modified protein / enzyme / eq) packaged into (secretory) vesicles (by Golgi apparatus) eq ; 9. vesicles {move towards / fuse with} cell surface membrane / correct reference to exocytosis / eq ;	(5)

Question Number	Answer	Mark
2 (d)	1. one (nucleus) fuses with the {egg nucleus / female gamete } / eq ; 2. one (nucleus) fuses with the (two) polar nuclei / eq ;	(2)



Question Number	Answer	Mark												
3(a)	<table><tr><th>Statement</th><th>True</th><th>Fa</th></tr><tr><td>HIV infects b-lymphocytes in the human immune system</td><td></td><td>✓</td></tr><tr><td>The genetic material in HIV is a form of RNA</td><td>✓</td><td></td></tr><tr><td>The enzyme, reverse transcriptase, is used by HIV</td><td>✓</td><td></td></tr></table> 1 mark each correct row ;;;	Statement	True	Fa	HIV infects b-lymphocytes in the human immune system		✓	The genetic material in HIV is a form of RNA	✓		The enzyme, reverse transcriptase, is used by HIV	✓		(3)
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The genetic material in HIV is a form of RNA	✓													
The enzyme, reverse transcriptase, is used by HIV	✓													

Question Number	Answer	Mark
3(b)(i)	- change in the {nucleotides / bases} / eq ; - in {RNA / DNA} / eq ; - which leads to change in the {sequence / eq} of amino acids in (primary structure of) a {polypeptide / protein} / eq ;	(2)



Question Number	Answer	Mark
3(b)(ii)	1. idea that HIV has {many / variety of / new / eq} {strains / types / antigens / protein coats / eq} (in infected person) ; 2. some strains {are / become} resistant to {an individual / a specific / a particular / eq} drug / eq ; 3. these would survive if (only one drug used) / eq ; 4. {mixture of drugs / eq } has more chance of getting rid of {all / more} (strains / types / eq) / eq ; 5. reference to drugs used together because of mutation ; 6. reference to rapid rate of mutation ; 7. reference to rapid rate of {multiplication / eq} of virus ;	(4)



Question Number	Answer	Mark
4(a)(i)	{sequence / order} of amino acids ; - joined by peptide bonds ;	(2)

Question Number	Answer	Mark
4(a)(ii)	- idea that primary structure determines (three-dimensional) folding / eq ; - reference to types of amino acids determine {types of bonds / (other than peptide bonds) / named bond}; - reference to position of amino acids determines position of{bonds / correctly named bond} ; - correct reference to two cys (amino acids) form bonds ; - idea that {shape / position / eq} of active site is determined by position of amino acids ; - reference to shape of active site being correct to bind to substrate ; - reference to {amino acids / R groups} involved in {chemical reaction / eq} ; - reference to {globular/ soluble / enzyme }molecules being {relatively short /small / made up of relatively few amino acids} ; - reference to {globular / soluble proteins/ enzyme} having relatively high number of { polar / small{ { amino acids / R groups} ; - reference to {polar R groups / eq} facing outwards ;	max (5)





DNA & Protein Synthesis

Question Number	Answer	Mark
4(b)(i)	1. reference to mRNA as a copy of the {genetic code / DNA} ; 2. of the protein (being synthesized) / eq ; 3. moves {out of the nucleus / to ribosomes } / eq ; 4. idea that it {acts as a template / has the instructions} for translation ;	max (3)

Question Number	Answer	Mark
4(b)(ii)	1. correct reference to translation ; 2. binds to an amino acid / takes the amino acid to the {ribosome / mRNA} ; 3. reference to tRNA being specific to amino acid ; 4. holds the amino acid in place / eq ;	max (3)



Question Number	Answer	Mark
5(a)(i)	1 glycerol molecule and 3 fatty acid molecules ;	(1)

Question Number	Answer	Mark
5(a)(ii)	ester bond ;	(1)

Question Number	Answer	Mark
5(a)(iii)	condensation ;	(1)

Question Number	Answer	Mark
5(a)(iv)	have double bonds between carbon atoms and between carbon and oxygen atoms ;	(1)

Question Number	Answer	Mark
5(a)(v)	more hydrogen atoms than unsaturated lipids ;	(1)





DNA & Protein Synthesis

Question Number	Answer	Mark
5(b)(i)	1. phosphate and base joined to pentose sugar ; 2. base correctly joined to sugar ; 3. phosphate correctly joined to two pentose sugars ;	(3)

Question Number	Answer	Mark
5(b)(ii)	(DNA) polymerase / (DNA) ligase / (DNA) helicase ;	(1)

