Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) 1. Condensation (reaction)/loss of water;

2. (Between) phosphate **and** deoxyribose;

3. (Catalysed by) DNA polymerase;

Reject if DNA polymerase joins AT/GC OR complementary nucleotides/bases OR forms hydrogen bonds

2 max

(b) Correct answer for 2 marks = 70;;

Accept for 1 mark,

A = 42 **and** T = 42

OR

420 (total bases in gene)

OR

210 (bases in template strand)

2

(c) Histone;

1

(d) 1. DNA helicase;

2. Breaks hydrogen bonds between base pairs/ AT and GC/complementary bases

OR

Breaks hydrogen bonds between <u>polynucleotide</u> strands;

Reject <u>hydrolysis</u> of hydrogen bonds

2

[7]

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Q2.

(a) 1. $C_{12}H_{22}O_{11}$;

2. Condensation reaction

OR

With a glycosidic bond;

Reject if any other named reaction or named bond given.
Reject if reaction includes addition of water.
Do not credit answers relating to other carbohydrates.

2

(b) 1. Y shape showing two long and two short (polypeptide) chains correctly positioned;

Drawing is nothing like an antibody = 0 marks.

2. (Alpha-gal) binding site labelled on the end of the branches of the Y of the antibody;

Accept one or two being labelled, if two both must be correct.

3. Variable region labelled

OR

Constant region labelled

OR

Disulfide bridge/bond labelled;

Accept description of 'variable region'.
Ignore labelling of light and heavy chains.
List rule applies.

3

(c) 1. (Part of tick protein and alpha-gal) have a similar shape/structure;

Accept '(Part of tick protein and alpha-gal) have the same shape/structure.'
*Do not credit reference to similar/same **tertiary** structure'.*
Ignore reference to alpha-gal being a protein.

2. Antibody is <u>complementary</u> to both (tick protein and alpha-gal)

OR

Antigen-binding site is <u>complementary</u> to both (tick protein and alpha-gal)

OR

Antibody can form <u>antigen-antibody complex</u> with both (tick protein and alpha-gal);

Reject reference to substrates or active sites.

2

(d) 1. Exposure to tick (protein) is followed by increase in antibody (specific to alpha-gal);

For 'is followed by' accept 'causes'.

2. (Later) greater/faster increase in antibody suggests there are memory cells;

Must be in relation to EITHER second exposure to tick (protein) OR to

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allergic reaction.

3. Antibody (specific to alpha-gal) increases during/after allergic reaction;
   Accept 'eating red meat' or 'eating/exposure to alpha-gal' for 'allergic reaction'.

4. During/after allergic reaction, total antibody increases more than alpha-gal antibody;
   Accept 'eating red meat' or 'eating/exposure to alpha-gal' for 'allergic reaction'.

5. (So) may be other antibodies (that are causing allergic reaction);

3 max

[10]

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