

Name of the Student: \_\_\_\_\_

Max. Marks : 22 Marks

Time : 22 Minutes

Mark Schemes

Q1.

- (a) 1. tRNA brings specific amino acid (to ribosome);  
2. Anticodon (on tRNA) binds to codon (on mRNA);  
3. Amino acids join by condensation reaction (using ATP)

OR

Amino acids join to form a peptide bond (using ATP);

3

- (b) 1. Hydrogen bonds form instead of ionic bonds;  
2. Changes the tertiary structure (of the crystallin);  
*Ignore reference to active site*

2

- (c) 3 correct = 2 marks;;

2 correct = 1 mark;

0 or 1 correct = 0 marks

|                                       |     |
|---------------------------------------|-----|
| mRNA codon for the non-mutant triplet | AGG |
| Mutated mRNA codon                    | GGG |
| Mutated DNA triplet                   | CCC |

2

[7]

Q2.

- (a) 4 rows correct = 2 marks;;  
2 or 3 rows correct = 1 mark;  
0 or 1 row correct = 0 marks

| Biological molecules | Element |          |        |             |
|----------------------|---------|----------|--------|-------------|
|                      | Carbon  | Nitrogen | Oxygen | Phosphorous |
| Galactose            | ✓       |          | ✓      |             |
| Phospholipid         | ✓       |          | ✓      | ✓           |
| RNA                  | ✓       | ✓        | ✓      | ✓           |
| Sucrose              | ✓       |          | ✓      |             |

2

- (b) Correct answer for 2 marks, 0.8376308/0.84/0.8 (hours);;

Accept for 1 mark,

Evidence of  $4 \times 10^6$  **and**  $3 \times 10^9$  (written in any format, for correct readings from graph)

**OR**

Evidence of 9.550746785 (correct number of generations)

**OR**

Evidence of 1.1938443348 (correct generations/ hour)

**OR**

Evidence of 50.26 (correct generation time in minutes)

Incorrect reading of graph,  $3 \times 10^6$  **and**  $2 \times 10^9$

Accept for 1 mark, calculation carried out correctly

Evidence of 9.380821784 (correct calculation of number of generations)

**OR**

Evidence of 1.172602723 (correct calculation of generations/ hour)

**OR**

Evidence of 51.16822503 (correct calculation of generation time in minutes)

**OR**

Evidence of 0.8528037505 (correct calculation of generation time in hours)

Incorrect reading of graph,  $10^{6.4}$  **and**  $10^{9.3}$  **OR**  $10^{6.3}$  **and**  $10^{9.2}$

Accept for 1 mark, calculation carried out correctly

Evidence of 9.633591475 (correct calculation of number of generations)

**OR**

Evidence of 1.204198934 (correct calculation of generations/ hour)

**OR**

Evidence of 49.82565445 (correct calculation of generation time in minutes)

**OR**

Evidence of 0.8304275742 (correct calculation of generation time in hours)

**OR**

Evidence of 0.83, with no other working

*Accept correct rounding to any number of decimal places*

2

(c) 1. (Model) **Q** **and**

(Name) Semi-conservative (replication);

Explanation

2. (Model) **P** (is unsupported because)

There should be two peaks in generation 1

**OR**

(Only) one peak is shown in generation 1

**OR**

There should be 3:1 (ratio) of peaks in generation 2

**OR**

There should **not** be an intermediate/ $^{15}\text{N}$   $^{14}\text{N}$  peak in generation 1/2/3

**OR**

The original/generation 0/ $^{15}\text{N}$  peak should be in generation 1/2/3;

3. (Model) **R** (is unsupported because)

There should be >2 peaks in generation 2/3

**OR**

There should be one wide/overlapping peak in generation 3;

*Accept answers 2. and 3. in either order*

*Accept for 'peak', density OR distribution*

*Accept for '>2', many OR several*

3

[7]

Q3.

(a)

| Letter | Statement                                                       |
|--------|-----------------------------------------------------------------|
| B;     | is a monomer in an enzyme's active site                         |
| D;     | is a monomer in cellulose                                       |
| C;     | is produced during photosynthesis and respiration               |
| B;     | forms a polymer that gives a positive result with a biuret test |

*Must be in correct order*

4

(b) C = 18, H = 32, O = 16;

*Accept only these answers*

1

(c) 1. Heat with acid **and** neutralise;

*Accept boil/water bath for heat*

*Accept named alkali for neutralise*

*Accept named examples, eg HCl, NaHCO<sub>3</sub>*

2. Heat with Benedict's (solution);

3. Red precipitate/colour;

*Accept other colours eg orange/ brown/green*

3

[8]