Rewarding Learning

General Certificate of Secondary Education

# Biology

Unit 2

Higher Tier

**[GBL22]**

# Assessment

# MARK SCHEME

## General Marking Instructions

The main purpose of the mark scheme is to ensure that each question is marked accurately, consistently and fairly.

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which students may produce. In the event of unanticipated answers, teachers and lecturers are expected to use their professional judgement to assess the validity of answers.

**Mark Scheme Annotation**

- The use of a solidus (/) denotes alternative answers which can be awarded within the same question (or marking point in a question worth more than one mark).
- The use of a semi-colon (;) denotes separate marking points. These are particularly relevant when separating the different marking points in a question worth more than one mark.
- Part of an answer within brackets indicates that this part is not essential to gain credit – the bracketed section is usually to set context or for the purpose of completeness.
- Some answers are shown as 'Any **two** from' (or any number between two and six). This means that any two (or other specified number) answers from the bullet-pointed list can be credited in this question or question part.

**Marking Calculations**

Full marks are normally awarded for the correct answer – irrespective of whether working out has been shown (even when asked to show working out.) The principle of 'error carried forward' (ECF) usually applies in that if a student makes a mistake in the first part of a three-mark, three-stage calculation then the final two marks can be awarded if the second and third stage processes are carried out correctly. The same principle applies to a mistake at any stage in a calculation.

**Marking QWC question**

See guidance in the mark scheme at the QWC question and also the section in the subject-specific guidance.

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| **1** | **(a)** | X = testis; | | [1] | |
| | **(b)** | **(i)** | Vasectomy/male sterilisation; | [1] | |
| | | **(ii)** | Any **two** from:<br>Sperm tube cut;<br>prevent sperm entering penis/travelling along sperm duct/entering female;<br>prevents **fertilisation**; | [2] | |
| | | **(iii)** | Reliable/permanent;<br>difficult to reverse; | [2] | 6 |
| **2** | **(a)** | 7889 – 6346 = 1543;<br>$\frac{1543}{6346} \times 100 = 24.31$;<br>24.3; | | [3] | |
| | **(b)** | Farmer chooses cow with large milk yield;<br>breeds it;<br>repeats over many generations; | | [3] | |
| | **(c)** | Diet; | | [1] | 7 |
| **3** | **(a)** | **(i)** | Artery causing a stroke has (fatty) deposit/described;<br>artery causing a stroke has a narrower lumen/artery blocked/described; | [2] | |
| | | **(ii)** | Any **one** from:<br>Reduced blood flow to brain cells;<br>brain tissue dies; | [1] | |
| | **(b)** | **(i)** | Any **two** from:<br>Wire mesh/stent inserted;<br>balloon inflated;<br>balloon deflated/removed; | [2] | |
| | | **(ii)** | Any **two** from:<br>Wire mesh/stent remains open;<br>lumen widens/increased blood flow; | [2] | |
| | **(c)** | Speech; | | [1] | 8 |

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| **4** | **(a)** | | 13.5 – 10.5 = 3.0;<br>3.0 ÷ 5;<br>0.6; | [3] | |
| | **(b)** | **(i)** | Carbon monoxide; | [1] | |
| | | **(ii)** | Less oxygen carried;<br>combines with red blood cells/haemoglobin; | [2] | 6 |
| **5** | **(a)** | **(i)** | A – Vena cava;<br>B – Aorta;<br>C – Left atrium; | [3] | |
| | | **(ii)** | Greater contraction/pressure;<br>Left ventricle pumps blood a longer distance around the body; | [2] | |
| | | **(iii)** | Prevent backflow of blood;<br>into the right atrium/from right ventricle; | [2] | |
| | **(b)** | **(i)** | Faulty valve does not close fully/open fully;<br>reduced blood flow through heart/reduced pressure/described; | [2] | |
| | | **(ii)** | Less oxygen/glucose to muscles/tissues;<br>Less respiration; | [2] | 11 |
| **6** | **(a)** | **(i)** | 100%/all lysed; | [1] | |
| | | **(ii)** | Any **four** from:<br>Water entered;<br>From dilute solution to concentrated solution;<br>Through selectively permeable membrane;<br>by osmosis;<br>no cell wall present to limit water intake/cell membrane bursts; | [4] | |
| | **(b)** | | Plant cell has a cell wall;<br>turgid; | [2] | 7 |
| **7** | **(a)** | | Oestrogen;<br>progesterone; | [2] | |
| | **(b)** | **(i)** | Thickness decreases from **6 mm to 2 mm/by 4 mm**; | [1] | |
| | | **(ii)** | Menstruation/period/uterus lining shed; | [1] | |
| | **(c)** | | Ovulation/egg released; | [1] | |
| | **(d)** | | Uterus lining remains thick/remains at 10 mm;<br>after day 28; | [2] | 7 |

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| **8** | **(a)** | **(i)** | Breast;<br>cervical; | [2] | |
| | | **(ii)** | Early detection/treatment before it spreads; | [1] | |
| | **(b)** | **(i)** | Lymphocytes; | [1] | |
| | | **(ii)** | Antigens; | [1] | |
| | | **(iii)** | Antibodies attach to antigens on surface of cancer cells;<br>antibodies complementary to antigens; | [2] | |
| | | **(iv)** | Any **four** from:<br>Immunotherapy will destroy 2 of the cells;<br>one cell does not have complementary antigens;<br>antibodies will have no effect;<br>this cell continues to divide/mitosis;<br>radiotherapy needed to destroy this cell; | [4] | 11 |
| **9** | **(a)** | **(i)** | Restriction; | [1] | |
| | | **(ii)** | Produce sticky ends;<br>sticky ends have (complementary) base pairing;<br>allows human insulin gene to attach to plasmid; | [3] | |
| | **(b)** | | Any **two** from:<br>Human insulin more effective;<br>quicker than extraction from animals/always available/produced on demand;<br>no ethical issues;<br>no allergic reaction;<br>no risk of transferring animal diseases; | [2] | 6 |

**10 (a) (i)** Bacteria; [1]

**(ii)** Droplet infection/airborne; [1]

**(b) Indicative Content**

- Preclinical trials;
- Using cells, tissues and living organisms;
- To check if drug is poisonous;
- How effective drug is;

- Clinical trials;
- Using healthy volunteers;
- To determine the optimum drug dosage;

| Band | Response | Mark |
|---|---|---|
| A | Candidates **must use appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 5</u> of the points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high** standard. | [5]–[6] |
| B | Candidates use **some appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 3</u> of the points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory** standard. | [3]–[4] |
| C | Candidates make **little use of specialist terms** throughout to describe and explain their conclusions **using <u>at least 1</u> of the points**. The spelling, punctuation and grammar, form and style are of a **limited** standard. | [1]–[2] |
| D | Response not worthy of credit. | [0] |

[6] 8

AVAILABLE MARKS

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| **11** | **(a)** | failure of blood to clot/blood doesn't clot; | | [1] | |
| | **(b)** | **(i)** Pedigree; | | [1] | |
| | | **(ii)** Allele/gene carried on sex/X chromosome; | | [1] | |
| | | **(iii)** Ross receives normal X chromosome from his mother/Amy;<br>receives Y chromosome from his father/Thomas; | | [2] | |
| | **(c)** | **(i)** Jamie's gametes $X^h$;<br>Grace's gametes $X^H$ $X^h$;<br>Genotype of children $\begin{array}{c\|c} X^HX^h & X^hX^h \\ \hline X^HY & X^hY \end{array}$; | | [4] | |
| | | **(ii)** 1 in 4/25 %; | | [1] | |
| | **(d)** | A female with haemophilia needs to inherit $X^h$ from each parent/two $X^h$;<br>her father must have haemophilia;<br>her mother must be a carrier; | | [3] | 13 |
| | | | **Total** | | **90** |