General Certificate of Secondary Education
2015

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

FRIDAY 5 JUNE, AFTERNOON

MARK
SCHEME

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.
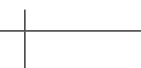
It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

						AVAILABLE MARKS
1	**(a)**		blood; brain;		[2]	
	(b)		**More** successful treatment/**less** damage/**more** likely to survive		[1]	3
2	**(a)**	**(i)**	Joining of an egg **nucleus** and a sperm nucleus;		[1]	
		(ii)	A in oviduct;		[1]	
		(iii)	Cell divides/mitosis/forms a ball/cells		[1]	
		(iv)	In lining of uterus		[1]	
	(b)	**(i)**	To cushion the baby/protect baby/support baby		[1]	
		(ii)	Large surface area/short diffusion distance/good blood supply/thin walls/villi;		[1]	
		(iii)	Oxygen; glucose;		[2]	
	(c)		Abstain/contraception/named method/pill/male or female sterilisation		[1]	9
3	**(a)**		Number of sunflowers y-axis [1]; Suitable scale [1] (at least half the grid); etc. [1] for correct plotting; [1] for bars (can do bars or histogram)		[4]	
	(b)		Continuous;		[1]	5
4	**(a)**		It is addictive		[1]	
	(b)		No tar/no carbon monoxide		[1]	
	(c)		70 cigarettes = [1] 7 packs = [1] 40 × 5 = [1] £28 = [2]		[2]	
	(d)	**(i)**	**Bronchi/bronchioles** narrow/inflamed		[1]	
		(ii)	Abnormal cell division uncontrolled cell division		[1]	6
5	**(a)**		(matching correct shapes or letters) A – T; C – G; Backbone correct;		[3]	
	(b)		sugar/deoxyribose; phosphate;		[2]	
	(c)		Double helix		[1]	
	(d)		Nucleus		[1]	7

6 **(a)** **(i)** Two XX chromosomes/No Y chromosomes [1]

(ii) Three chromosomes at number 21/47 chromosomes/an extra chromosome [1]

(b) **(i)** As the age of the mother **increases** the chance of having a child with Down Syndrome **increases** [1]

(ii) 1 in 200 and 1 in 1000; $\frac{1000}{200}$ = **5** = [2] [2]

(iii) • Parents should not be able to **select** something, e.g. sex of baby;
• Increased risk of **miscarriage**
• May opt for termination/**abortion** [2]

(c) **(i)**

	X	Y
X	XX	XY
X	XX	XY

Punnett square; ─┬─
Correct gametes for each parent = [2];
Correct cross (even if wrong gametes); [4]

(ii) 1 : 1 or 2 : 2 [1]

<div style="text-align:right">12</div>

7

	Patient/s who is/are	Evidence	
Male	A;	Testosterone	;
Most likely to be a smoker	B;	CO/carbon monoxide	;
Most likely to be receiving IVF treatment	C;	Fertility hormones	;
Most likely to be a binge drinker	A;	**High** blood alcohol level	;

<div style="text-align:right">8</div>

8   **Indicative content:**
     Any six from:
     • soak **a** disc in an antibiotic or both discs
     • set discs on agar
     • incubate/leave for 24 hrs or more
     • at 25°C/less than 25°C/about 25°C
     • seal/use sellotape/do not reopen
     • autoclave/sterilise after/safe disposal/wipe benches (before or after)
     • **A** has a bigger clear area
     • **A** kills more bacteria/prevents more growth

Response	Mark
Candidates give 5 or 6 points from the indicative content to describe how to set up the Petri dishes and interpret the results and give safety precautions for the investigation. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates give 3 or 4 points from the indicative content to describe how to set up the agar plates or interpret the results or give safety precautions for the investigation.	[3]–[4]
Candidates give 1 or 2 points from the indicative content to describe how to set up the agar plates or interpret the results or give safety precautions for the investigation.	[1]–[2]
Response not worthy of credit.	[0]

                                                                    [6]   6

9   **(a) (i)**   8%;   [1]

     (ii) No net movement of water/water is neither moving into or out of the potato
               concentrations inside and outside are equal/isotonic   [1]

     (b) (i)   Turgid cell drawn – looks more turgid than in **(ii)**;   [1]

     (ii) Correct label for cell wall **must** be a double line
               Correct label for cell membrane [1]
               Plasmolysed cell drawn (cell membrane pulled away from wall at
               all or some parts) [1]   [3]

     (c)   Cell wall = limits the entry of water/stops cell from bursting/stops lysis   [1]   7

10 (a) Any **four** from:

- Fat/fatty deposits/cholesterol in the blood vessel/coronary arteries/clot
- Clot/blockage/reduces or stops the blood flow (to heart muscle)
- Less oxygen/glucose reaches the heart muscle
- No/less respiration
- Muscle cells die/heart stops **beating**/heart stops **contracting** [4]

(b) (i) Any **three** from four:

Reduction statement – cholesterol reduced with statins **or** reduced without statins/with diet
- Statins reduce cholesterol from 6 to **3.8 units**/by 2.2 units;
- Without statins cholesterol levels are reduced from 6 to **5.5**/ reduced by 0.5;

Comparison mark
- Statins reduce cholesterol levels **more** than without statins
- statins reduce it **faster**/or difference from 5.5–3.8 or diff of 1.7 [3]

Maximum [2] for data (after 6 months)

(ii) To **compare** this group with those that took statins/as a **control**/to see if statins make the level drop **faster**/to see if diet alone can bring down cholesterol [1]

(iii) 12 000 men;
= 2000 women [2]
Correct answer [2]

(iv) Any **two** from:
- Reduce salt intake/less salt
- Exercise/more sport (described)
- Reduce stress
- Don't smoke/give up smoking
- Don't binge drink/don't drink/drink less [2] 12

11 (a) Any **three** from:
- Remove the **gene for insulin**
- Remove the plasmid (from the bacterium)
- Cut the plasmid open/split plasmid open
- Insert insulin gene (into plasmid/bacterial DNA) [3]

(b) The bacteria reproduce/clone themselves/bacteria put into a fermenter/ bioreactor [1]

(c) Any **two** from:
- Human insulin has no side effects/no allergic reactions/no rejection
- Don't have to kill/harm any animals/no ethical issues [2]

(d) Diabetes [1] 7

12 **(a)** Stomata [1]

(b) **(i)** Potometer [1]

(ii) Use the syringe [1]

(c) **(i)** Air bubble drawn in correctly (right hand side of the bubble must start at 6) [1]

(ii) 8 mm [1]

(d) 8 [1]

(e) **(i)** Fan on/wind [1]

(ii) Bubble moves less/decreases/bubble doesn't move at all [1]   8

Total   **90**