Rewarding Learning

General Certificate of Secondary Education
2020–2021

Single Award Science: Biology

Unit 1

Higher Tier

[GSA12]

WEDNESDAY 11 NOVEMBER, MORNING

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCSE Single Award Science

Candidates must:

AO1 Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures;

AO2 Apply knowledge, skills and understanding of scientific ideas, scientific enquiry, techniques and procedures; and

AO3 Analyse information and ideas to interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

				AVAILABLE MARKS
1	**(a)**	**(i)**	Cancer cells have a larger nucleus [1] cancer cells have a thicker cell membrane/cancer cells are smaller than normal cells [1] [2]	
		(ii)	Burst through blood vessel wall into bloodstream/travel in blood [1]	
	(b)	**(i)**	Ultraviolet/UV radiation [1]	
		(ii)	12 000 – 4000 = 8000 [1] 8000 ÷ 4000 × 100 = 200% [1] 200% [2] [2]	
		(iii)	Increased awareness and detection/increased use of tanning beds/ depletion of the ozone layer [1]	7
2	**(a)**	**(i)**	<u>Large</u> number/range of habitats [1] each with a large number of different flowering plants/insects/bird species [1] [2]	
		(ii)	Living factor (that can be used to monitor environmental change) [1]	
		(iii)	More lichen [1] less pollution in Oxford Island [1] [2]	
	(b)		Any **two** from: • limiting fishing days • decommissioning some boats/limiting the number of licenses • limits on net sizes • larger mesh sizes • sanctuaries [2]	7

3 Indicative content

- lymphocytes
- produce antibodies
- in response to the antigens on microorganism
- the antibodies are complementary in shape
- they latch on to the antigen
- this clumps them together/immobilises them
- phagocytes
- engulf
- and digests microorganism

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain how white blood cells respond to infection using **more than six** of the points above, in a logical sequence. 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 to describe and explain how white blood cells respond to infection using **four or five** of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates partially describe and explain how white blood cells respond to infection using **one to three** of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

AVAILABLE MARKS

6

				AVAILABLE MARKS
4	**(a)**	Any **three** from: • build-up of fatty material <u>narrows</u> the artery/stops blood flow to the heart/causes a blood clot • blood carrying oxygen/glucose cannot pass through to the heart • heart muscle cells cannot respire • heart muscle cells die	[3]	
	(b)	**(i)** Cells that can divide [1] to form other cells of the **same** general type [1]	[2]	
		(ii) Less time spent in hospital/less drugs and medicines needed	[1]	
	(c)	**(i)** Stress/lack of exercise	[1]	
		(ii) Combines with red blood cells [1] to reduce the amount of oxygen carried in the blood [1]	[2]	9
5	**(a)**	**(i)** (Number of) bacteria A no effect and (number of) bacteria B decreased	[1]	
		(ii) (Bacteria A) are resistant to the antibiotics [1] Any **two** from: • they survive • to reproduce • to pass on their genes to the next generation [2]	[3]	
	(b)	**(i)** The process of change in a species/type of organism [1] over time [1]	[2]	
		(ii) Large timescales involved/lack of evidence	[1]	7
6	**(a)**	An allele that will only show in the phenotype if both alleles are recessive/there is no dominant allele present	[1]	
	(b)	**(i)**	[2]	

	H	h
H	HH	Hh
h	Hh	hh

		(ii) hh	[1]	
	(c)	**(i)** Genetic screening	[1]	
		(ii) It can lead to miscarriage/or other acceptable answer	[1]	6

					AVAILABLE MARKS
7	(a)		**C E A B**	[2]	
	(b)		Advantage – large quantities produced/not different from human insulin [1] Disadvantage – moral issues/could be unexpected or unforeseen outcomes/ some of the DNA could make it into environment [1]	[2]	
	(c)		The entire genetic make-up of an individual	[1]	5
8	(a)	(i)	Reflex arc	[1]	
		(ii)	Arrow pointing upwards towards spinal cord	[1]	
		(iii)	Association/relay/connector	[1]	
	(b)	(i)	As the neurone diameter increases the speed of nerve impulse increases	[1]	
		(ii)	They have a large neurone diameter so their reactions are fast	[1]	5
9	(a)	(i)	Days 1–5	[1]	
		(ii)	When the levels of both oestrogen and progesterone [1] fall [1]	[2]	
		(iii)	The uterus lining would be thickened/lining would be maintained/ build-up of lining would continue	[1]	
	(b)	(i)	Haploid	[1]	
		(ii)	Double number of chromosomes/46 chromosomes/23 pairs	[1]	
	(c)		Contraceptive pill [1] prevents the ovaries releasing ova/stops development of ovum [1]	[2]	8
				Total	**60**