

GCE



Edexcel GCE

Biology (6102/01)

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Mark Scheme (Results)

## General Principles

### Symbols used in the mark scheme

Symbol	Meaning of symbol
; semi colon	Indicates the end of a marking point.
eq	Indicates that credit should be given for other correct alternatives to a word or statement, as discussed in the Standardisation meeting. It is used because it is not always possible to list every alternative answer that a candidate may write that is worthy of credit.
/ oblique	Words or phrases separated by an oblique are alternatives to each other.
{ } curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion.
() round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point.
[] square brackets	Words inside square brackets are instructions or guidance for examiners.

### Crossed out work

If a candidate has crossed out an answer and written new text, the crossed out work can be ignored. If the candidate has crossed out work but written no new text, the crossed out work for that question or part question should be marked, as far as it is possible to do so.

### Spelling and clarity

In general, an error made in an early part of a question is penalised when it occurs but not subsequently. The candidate is penalised once only and can gain credit in later parts of the question by correct reasoning from the earlier incorrect answer.

No marks are awarded specifically for quality of language in the written papers, except for the essays in the synoptic paper. Use of English is however taken into account as follows:

- the spelling of technical terms must be sufficiently correct for the answer to be unambiguous  
 e.g. for amylase, 'ammalase' is acceptable whereas 'amylose' is not  
 e.g. for glycogen, 'glicojen' is acceptable whereas 'glucagen' is not  
 e.g. for ileum, 'illeum' is acceptable whereas 'ilium' is not  
 e.g. for mitosis, 'mytosis' is acceptable whereas 'meitosis' is not
- candidates must make their meaning clear to the examiner to gain the mark.
- a correct statement that is contradicted by an incorrect statement in the same part of an answer gains no mark - irrelevant material should be ignored.

## Unit 2B (6102)

## Question 1

Maximum mark

Statement	First division of meiosis	Second division of meiosis
Pairing of homologous chromosomes occurs	✓	✗
Each chromosome consists of a pair of chromatids during prophase	✓	✓
Crossing over occurs and chiasmata are formed	✓	✗
Independent assortment of chromosomes occurs	✓	✗

[Any two correct responses = 1 mark]

[Blanks are incorrect]

[✗ is incorrect ]

Total 4 marks

**Question 2**

**Maximum mark**

- (a)
1. Mechanically breaks down large food mass / reference to mechanical digestion / reference to increasing surface area ;
  2. Mixes food with saliva ;
  3. Reference to {tasting / lubrication / (facility of) swallowing} ;

**3 marks**

- (b)
1. (Bread contains) starch ;
  2. Saliva contains amylase /reference to salivary amylase ;
  3. Starch hydrolysed to {maltose /(soluble) sugars / disaccharides} (which taste sweet) ;

**3 marks**

**Total 6 marks**

**Question 3****Maximum mark**

- (a) (i) 1. Idea that percentage saturation increases as  $pO_2$  increases ;  
2. Reference to greatest change between 1 and 3 / 5 kPa ;  
3. Levels out at high  $pO_2$  / eq;  
4. Credit manipulated quantitative comment ;

**2 marks**

- (ii) 1. Mouse has much smaller (body) volume/  
Greater surface area : volume ratio ;  
2. Increased heat loss ;  
3. Increased {metabolic rate / metabolism} ;  
4. Haemoglobin has a lower affinity (for oxygen) ;  
5. Therefore {oxygen released more readily / more oxygen released} to tissues ;  
[Mark scheme refers to mouse; could accept converse points for human]

**2 marks**

- (b) 1. Contraction of external intercostal muscles ;  
2. Relaxation of internal intercostal muscles ;  
3. Contraction of diaphragm ;  
4. Diaphragm {flattens / moves down} / ribs move up ;  
5. Increased volume of thorax / eq ;  
6. Decreased pressure in lungs (so air enters) ;

**4 marks****Total 8 marks**

**Question 4**

**Maximum mark**

- (a)
- A Primordial follicle / primary follicle ;
  - B Secondary oocyte ;
  - C Corpus luteum / yellow body ;

**3 marks**

- (b) (i)
1. Slow increase up to 10 weeks ;
  2. Faster increase to 29 - 32 weeks / reaches peak at 29 - 32 weeks ;
  3. Then decreases ;

**2 marks**

- (ii) Maintenance of endometrium / inhibits {FSH / LH / oxytocin / ovulation / uterine contractions / prolactin} / preparation for lactation / increased vascularisation of uterus ;

**1 mark**

**Total 6 marks**

**Question 5**

**Maximum mark**

- (a)
1. Reference to streamlined shape ;
  2. Less resistance to water /eq ;
  3. {Legs / feet }with {hooks / claws} ;
  4. Gripping substrate / eq ;
  5. Gills (on abdomen) ;
  6. For gas exchange in water / eq ;
  7. Antennae ;
  8. Detecting water current ;

**4 marks**

- (b) (i)
1. Presence of haemoglobin / eq ;
  2. For uptake of oxygen /with high affinity for oxygen ;
  3. Presence of breathing tube / eq ;
  4. To obtain oxygen from air /eq ;
  5. Gills ;
  6. To increase surface area (for uptake of oxygen) ;
  7. Lower rate of respiration ;
  8. Less oxygen required ;

**4 marks**

**Question 5 continued**

**Maximum mark**

- (ii) 1. (Numbers increase as) pollution decreases ;  
2. (And) oxygen levels increase ;  
3. Less competition (from other species) / less predation ;  
4. More food available ;  
5. Larvae move down stream ;

**2 marks**

**Total 10 marks**



## Question 6

Maximum mark

- (a) (i) Epidermis / piliferous (tissue) ; 1 mark
- (ii) 1. Apoplast pathway explained / eq ;  
2. Symplast pathway explained / eq ;  
3. Vacuolar pathway ;  
4. Reference to reaching endodermis ;  
5. Reference to Casparian strip ;  
6. Reference to function of {endodermis / Casparian strip} ; 4 marks
- (b) (i) Set up under water / ensure no air bubbles at start / completely sealed joints / airtight ; 1 mark
- (ii) To move bubble back to start of scale / eq ; 1 mark
- (iii) Uptake =  $5.4 \text{ (mm}^3\text{)} / \frac{9.2 - 3.8}{8}$  ;  
Rate =  $0.675 \text{ (mm}^3\text{ per minute)}$  ; 2 marks
- Total 9 marks**

**Question 7**

**Maximum mark**

- (a) Artery / arteriole ; 1 mark
- (b) (i) Tunica media / middle coat ; 1 mark
- (ii) Provide {strength / support } / prevents bursting ;  
Idea that they enable artery to withstand high blood pressure / eq ; 2 marks
- (c) 1. Separation of deoxygenated and oxygenated blood ;  
2. (Therefore) better {oxygenation of blood / oxygen supply to tissues} ;  
3. Maintains different pressure to lungs and rest of body / eq ;  
4. Mammals have a high(er) demand for oxygen ;  
5. Idea of repressurisation ; 2 mark

**Total 6 marks**

Question 8

Maximum mark

- (a)           A           Seminal vesicle ;  
                  B           Prostate (gland) ;

2 mark

(b)           *Accept references to :*

1. Providing lubrication ;
2. Providing nutrients / named example ;
3. Contain hormones /ref to prostaglandins ;
4. Provide fluid for sperm transport ;
5. Provide antioxidants / vitamin C (to prevent sperm deformation / remove free radicals) ;
6. Providing an alkaline medium ;

2 marks

- (c)
1. Erection / eq of penis ;
  2. By increased blood pressure / eq ;
  3. Penis inserted into vagina ;
  4. Muscle contractions cause ejaculation ;
  5. Through urethra ;

4 marks

Question 8 continued

Maximum mark

- (d) (i)
1. Higher temperature (of testes) qualified ;
  2. Reference to environmental oestrogens / pesticides ;
  3. (Environmental) radiation ;
  4. Stress ;
  5. Smoking ;
  6. (Use of) drugs ;
  7. Alcohol ;

2 marks

(ii) *Consequence* :

Decreased fertility / decreased birth rate / decreased population size / increase in IVF / eq ;

1 mark

Total 11 marks