Edexcel GCE

Biology Unit 5 (6105)
Paper 01

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Mark Scheme Results

Edexcel GCE

Biology 6105/01

N25406A

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.

Question 1 **Maximum mark**

Animalia ;

Class ;

Family ;

leo / *Panthera leo* ;

4 marks

Question 2 **Maximum mark**

(a)
1. Factor which {controls / eq} the rate
2. Increasing this factor increases the rate (of photosynthesis) ;
3. Factor {not at optimum / nearest its {threshold / minimum} value / eq} ;

2 marks

(b) [condition + control for two marks]

1. Temperature ;
   Use water bath / description of heat filter / eq ;
2. Carbon dioxide ;
   adding sodium hydrogen carbonate / bubble through carbon dioxide / eq ;
3. {Wavelength / colour} of light ;
   Use same {light source / filter / gel } ;
4. pH ; [not acidity /alkalinity]
   Buffer ;

4 marks

(c)
1. {Equilibrate / eq} before timing ;
2. {Clear / remove} bubbles from capillary tube at start / eq ;
3. Use syringe to move {oxygen / gas bubble} into capillary tube / eq;
4. measure length of bubble / eq;
5. Correct reference to determining volume of oxygen / eq ;
6. Correct reference to rate calculation ;
7. Reference to repeats to give {mean /reliable} results / eq;

4 marks

Question 2 continued **Maximum mark**

(d) 1. Reference to {filters / gels / coloured bulbs / eq} ;

2. Reference to appropriate qualification e.g. filters placed in correct position / keeping light intensity the same / all other factors the same ;

2 marks

Total 12 marks

Question 3 **Maximum mark**

(a) 1. Increase / eq ;

2. Not {grazed / eaten} (by the rabbits) ;

2 marks

(b) (i) 1. Idea of sub climax / eq ;

2. Reference to a {factor / activity e.g. grazing, mowing /eq} that maintains (the sub climax) ;

2 marks

(ii) 1. Reference to removal of grazer / eq ;

2. Allows {new / different / eq} {species / plants} to {grow / colonise } ;

3. Reference to {competitive effects / change in soil /eq} ;

4. Will go through several stages / eq;

5. Reference to succession ;

6. Reference to climatic climax / eq ;

7. Change in species composition / different food {web /chains} / eq;

4 marks

Total 8 marks

Question 4 **Maximum mark**

(a) (i) (15 – 6) ÷ 6.0 x 100 OR 9.0 ÷ 6.0 x 100 ;

= 150 (%) ;

2 marks

(ii) Water reabsorbed / eq ;

1 mark

(b)
1. Ref. to (glucose) {concentration / diffusion} gradient ;
2. Enters cell by diffusion / ref. to sodium-glucose cotransport ;
3. Microvilli / brush border increases surface area ;
4. Ref. to need to maintain concentration gradient between cell and lumen / eq ;
5. Active transport removes glucose from cell ;
6. Mitochondrion to provide {energy / ATP};
7. Ref. to { transport proteins / sodium-potassium pump / eq };

4 marks

(c)
1. No {membrane-bound organelles/ one named example} ; [not nucleus]
2. DNA in cytoplasm / no {nucleus / nucleus envelope} ;
3. has plasmid / circular DNA ;
4. No {chromatin / nucleolus / eq} ;
5. Has {smaller / 7Os} ribosomes / eq ;
6. Has cell wall ;
7. Has {flagellum / fibriae / pili / other example associated with cell wall} ;

3 marks

Total 10 marks

Question 5 **Maximum mark**

(a) 1. Heterozygous / heterozygote ;

2. Have {recessive allele / allele that is not expressed / eq} ;

3. Idea of future inheritance / eq ;

2 marks

(b) (i) 1. Smaller surface area ;

2. Less haemoglobin ;

3. ref. to different haemoglobin structure / eq ;

4. Get stuck in capillary ;

2 marks

(ii) 1. Parents genotypes: both Hb^A Hb^S OR Hb^A Hb^S and Hb^S Hb^S ;

2. Gametes shown ;

3. Identification of Hb^S Hb^S as sickle cell anaemia ;

3 marks

(iii) 1 in 2 / 50% / 0.5 / ½ ;

1 mark

(c) 1. {Codon / triplet} codes for amino acid ;

2. Reference to substitution a base / eq ;

3. Idea of DNA used as a template ;

4. (So) error transferred to mRNA (during transcription) / eq ;

5. translation at ribosome / polypeptide formed at ribosome ;

6. Ref. tRNA with amino acid(s) used ;

7. Reference to different anti codon ;

[Marks could be gained from good diagram]

4 marks

Total 12 marks

Question 6 **Maximum mark**

(a) *Rhizobium* / *Azotobacter* / *Nostoc* / other suitable eq ;

1 mark

(b) 1. Catalyst / lowers activation energy ;

2. (For the) {conversion / reduction} of nitrogen (gas) to {ammonia / ammonium} ;

2 marks

(c) (ATP):

1. Source of energy ;
2. For activation / eq ;
3. Reference to phosphorylation ;

(Metal ions):

4 Reference to {cofactors / prosthetic groups / non protein group} / bind to enzyme ;

5. Idea of enabling substrate-enzyme complex to form ;
6. Ref to affecting bond energy / bonding within enzyme ;

4 marks

Question 6 continued **Maximum mark**

(d) [Credit points where relevant in other methods]

1. Identify gene / eq (for nitrogenase) in bacterium ;
2. Cut out using restriction enzyme / eq ;
3. {obtain / use} plasmid ;
4. Open plasmid using same restriction enzyme ;
5. Reference to sticky ends / eq ;
6. {Joining / annealing} with ligase ;
7. To form recombinant plasmid ;
8. Plasmid inserted into host cell (Agrobacterium) ;
9. Altered bacterium enters plant cells / eq ;
10. {Growth / production} of callus ;
11. Wheat plants grown from callus ;
12. Ref. to replication {gene / plasmid} ;

5 marks

Total 12 marks

Question 7 **Maximum mark**

(a)
1. Overall {rise / increase} / eq ;
2. Decrease between 1994 and 1996 ;
3. {Plateau / levels out} in {1982 - 1984 / 1988 - 1990} ;
4. Manipulation of figures with units;

3 marks

(b)
1. Mixed with {petrol / eq} / used in gasohol ; [not diesel]
2. (About)10 – 20 % ethanol ;

2 marks

(c)
1. Starch is made up of glucose sub–units / eq ;
2. Ref. to glycosidic bonding ;
3. Starch {hydrolysed/eq} to {sugar / glucose / monsaccharide / disaccharide} ;
4. Using amylase / let grains germinate / boiling / adding acid / eq ;
5. Ref. to glycolysis / description ;
6. Produces {pyruvate / pyruvic acid} ;
7. Anaerobic respiration / anaerobic conditions / eq ;
8. {Pyruvate / pyruvic acid}{ converted / decarboxylation} to ethanol ;
9. Ethanal acts as hydrogen acceptor / $NADH_2 \rightarrow NAD$;

6 marks

(d) Biogas / methane ;

1 mark

Total 12 marks