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Mark Scheme Summer 2009

GCE

GCE08 Biology (8BI01)

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GENERAL INFORMATION

The following symbols are used in the mark schemes for all questions:

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
/ 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
[CE] or [TE]	Consecutive error / transferred error

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

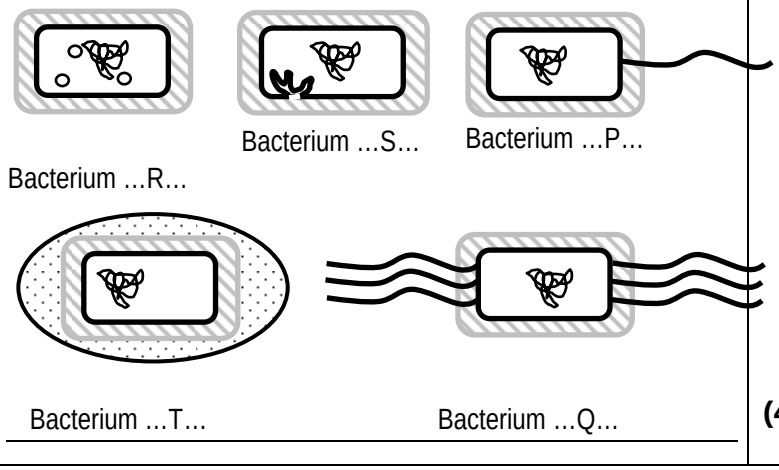
- candidates must make their meaning clear to the examiner to gain the mark.

- 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

6BI02/01
Development, Plants & the Environment

Question Number	Answer	Mark
1(a)(i)	1. circular DNA box ; 2. small / 70s ribosomes box;	**(2)**

Question Number	Answer	Mark
1(a)(ii)	<table><tr><th>**Features present in mitochondria**</th><th>**Feature also present (✓) or absent (×) in chloroplasts**</th></tr><tr><td>Surrounded by a double membrane</td><td>✓</td></tr><tr><td>Crista present</td><td>×</td></tr><tr><td>Circular DNA</td><td>✓</td></tr><tr><td>Matrix</td><td>×</td></tr><tr><td>Glycogen granule</td><td>×</td></tr><tr><td>Stalked particles</td><td>×</td></tr></table> **1 mark** for any two correct ;;;	**(3)**

Question Number	Answer	Mark
1(b)		**(4)**

Question Number	Answer	Mark
2(a)(i)	organ has {many / eq} functions, tissue has {one / fewer / eq}, organ has {many / several / eq} {cell types / tissues}, tissue has {one / fewer / eq} ;	**(1)**

Question Number	Answer	Mark
2(a)(ii)	both have cells {working together / for the same function / eq} ;	**(1)**

Question Number	Answer	Mark
2(b)		**(3)**

Description of Organelle	**Name of Organelle**
Several curved membrane-bound sacs of decreasing size	golgi (apparatus / body) ;
A pair of cylinders arranged at right-angles to each other	{centrioles / centrosome / eq} ;
Small spheres with a single membrane that are filled with hydrolytic enzymes	lysosome(s) ;

Question Number	Answer	Mark
2(c)	**Drawing** (max 2): 1. {double membrane / nuclear envelope} obvious ; 2. nuclear pores shown ; 3. (1 or more) nucleoli present ; **Labels** (max 2): 4. (nuclear) envelope / <u>double</u> membrane / {<u>inner</u> / <u>outer</u>} (nuclear) membrane ; 5. (nuclear) pore ; 6. nucleolus ; 7. correct reference to chromatin / nucleoplasm ;	**max (4)**

Question Number	Answer	Mark
3(a)		**(4)**

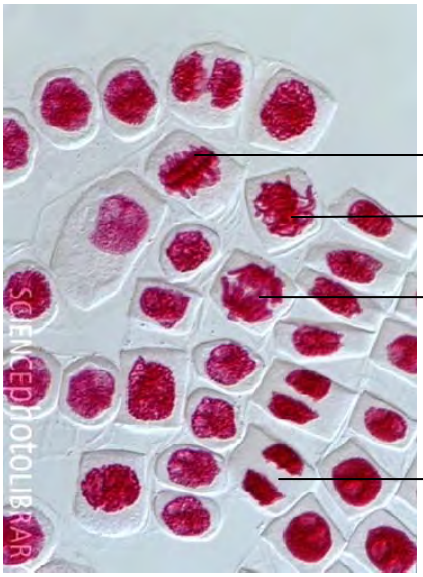
Name of adaptations	**Example**
physiological ;	Some metabolic reactions become less efficient in cold weather so the organism generates more heat to keep warm
behavioural ;	Sheep learn to ignore sounds that have no importance to them
anatomical ;	The ears of African elephants are larger than those of Asian elephants, due to differences in the environment
physiological ;	Formation of a sun tan when human skin is exposed to sunlight

Question Number	Answer	Mark
3(b)	**N.B. D = description; E = explanation** **Points to be paired i.e. cannot score three marks for three D points** 1D {haploid / 23 chromosomes / half set of chromosomes in } nucleus ; 1E so that {{diploid / eq} number / full complement / 46 chromosomes} restored(at fertilisation) ; 2D lipid droplets / food store / eq ; 2E supplies {energy / nutrients} for division / eq ; 3D large (cell) {size / surface area / eq} ; 3E increased chance of fertilisation / eq ; 4D reference to {cortical granules / lysosomes / zona pellucida} (in cytoplasm) ; 4E to prevent {more sperm entry / polyspermy / eq} ; 5D reference to {release / eq} of a {chemical / eq} ; 5E to attract sperm / chemotaxis / eq ; 6D membrane with '(sperm) receptors' on surface / eq ; 6E to allow sperm to {bind / eq} ; 7D {much / eq} mRNA present ; 7E to allow early translation of transcription factors / eq ;	**max (4)**

Question Number	Answer	Mark
3(c)	1. {pine needles /extract / filter paper soaked in extract} placed on {agar plate / in wells / eq} ; 2. with bacterial {lawn / eq} ; 3. reference to sterile/aseptic approach e.g. appropriate reference to sealing ; 4. reference to an appropriate time (for incubation) e.g. 24 hours, 1 week ; 5. (incubate at) a sensible temperature suggested e.g. 25°C ; **NOT** 37°C / human body temp 6. (looking for) {clear area / inhibition zone / loss of cloudiness /reduced cell number/ eq} (around pine needles, extract / filter paper / wells) ; 7. (clear area) shows no bacteria / eq ; 8. reference to suitable control ;	**max (5)**

Question Number	Answer	Mark
4(a)		**(2)**

Statements about cell division	**Meiosis is involved**
Required for both sexual and asexual reproduction	
Produces gametes	✓ ;
Crossing over can occur	✓;
Occurs in mammals but not flowering plants	

Question Number	Answer	Mark
4(b)	 A – metaphase ; B – prophase ; C – anaphase ; D – telophase ;	**(4)**

Question Number	Answer	Mark
4(c)(i)	site of {cell division / mitosis / actively dividing cells / meristem / eq);	**(1)**

Question Number	Answer	Mark
4(c)(ii)	to {soften the material / macerate / break middle lamella / eq};	**(1)**

Question Number	Answer	Mark
4(c)(iii)	{(acetic) orcein / lacto-propionic orcein / toluidine (blue) / Schiffs / eq} ;	**(1)**

Question Number	Answer	Mark
4(c)(iv)	each mark is for the risk + appropriate precaution 1. cut and appropriate precaution ; 2. acid and appropriate precaution ; 3. heat and appropriate precaution ; 4. stain and appropriate precaution ; 5. coverslip and appropriate precaution ;	**max (2)**

Question Number	Answer	Mark
5(a)(i)	reference to {chemical / air / gravity / light / eq} ;	**(1)**

Question Number	Answer	Mark
5(a)(ii)	1. idea of {breakdown / digestion / eq} of style ; 2. (breaks down) protein / pectin / middle lamella ; 3. reference to hydrolysis / eq ; 4. easier for pollen tube to grow / reduced resistance / eq ; 5. supplies {nutrients / named nutrient / energy} for (pollen tube) growth / eq ;	**max (3)**

Question Number	Answer	Mark
5(b)	1. photosynthesis ; 2. {component / eq} of {cytoplasm / sap} ; 3. water as a solvent /eq ; 4. water as a transport medium /eq ; 5. involved in thermoregulation / eq ; 6. reference to role in structural support ; 7. reference to involvement in hydrolysis ; 8. reference to turgor changes ;	**max (3)**

Question Number	Answer	Mark
6(a)(i)	1. A ; then any **two** from: 2. height controlled by {many / eq} genes / polygenic inheritance / eq ; 3. reference to continuous variation ; 4. reference to normal distribution / eq ;	**max (3)**

Question Number	Answer	Mark
6(a)(ii)	1. water / humidity ; 2. light ; 3. minerals / soil type / pH ; 4. CO_2 ; 5. temperature ; 6. altitude ;	**max (2)**

Question Number	Answer	Mark
6(b)(i)	height of bar must be at 50 i.e. 2 ½ little squares above 40 ;	**(1)**

Question Number	Answer	Mark
6(b)(ii)	1. height (of yarrow plant) decreases (as altitude increases) ; 2. non-linear /eq ; 3. correct manipulation of the data ;	**max (2)**

Question Number	Answer	Mark
6(c)(i)	{no change in / same} height of plants at 700m / reached their maximum height (of 50cm) / eq ;	**(1)**

Question Number	Answer	Mark
6(c)(ii)	{decrease in / lower / different} height of plants at 3000m / 25cm at 3000m and 50cm at 700m / eq ;	**(1)**

Question Number	Answer	Mark
6(c)(iii)	removal of genetic variation / they are all genetically identical / eq ;	**(1)**

Question Number	Answer	Mark
6(c)(iv)	to act as a control / to see if there is a difference at the other heights / as a comparison / to check that the clones grow the same as the parent plants / eq ;	**(1)**

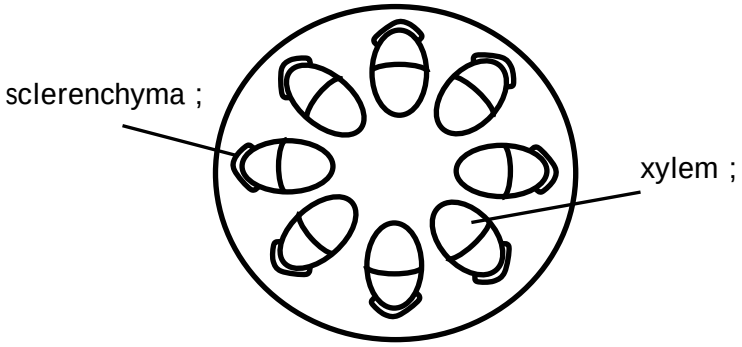
Question Number	Answer	Mark
7(a)	1. some people with (new) drug and some without (new) drug / eq ; 2. use placebo / description (e.g. sugar-coated dummy pill) /old drug ; 3. {doctors / eq} and {subjects / eq} do not know who is on (new) drug or who is not /eq ; 4. to see if new drug works better than {placebo / old drug}/eq ; 5. reduces bias /eq ;	**max (3)**

Question Number	Answer	Mark
7 (b)(i)	glycosidic ;	**(1)**

Question Number	Answer	Mark
7(b)(ii)	{ α / alpha} glucose ;	**(1)**

Question Number	Answer	Mark
7(b)(iii)	1. {bioplastic / starch} comes from {plants / eq} ; 2. {plants / starch} are renewable ; 3. oil-based plastic is from non-renewable resource / eq ;	**max (2)**

Question Number	Answer	Mark
7(b)(iv)	will not accumulate / not contribute to landfill / can be decomposed / eq ;	**(1)**

Question Number	Answer	Mark
7(c)		**(2)**

Question Number	Answer	Mark
8(a)	1. protein release from ribosome /eq ; 2. enter the rER {lumen / eq} ; 3. becomes packaged into (rER) vesicles ; 4. (vesicles / proteins) move to Golgi (apparatus) / {vesicles fuse with / protein enters} Golgi ; 5. protein {modified / carbohydrate added / named carbohydrate added} / eq ; 6. then become packaged into (secretory) vesicles / eq ; 7. glycoprotein becomes part of (vesicle) membrane ; 8. vesicles {move towards / fuse with} the cell (surface) membrane ;	**max (5)**

Question Number	Answer	Mark
8(b)(i)	1. totipotent (stem cells) can give rise to {all / any / 216} cell types / eq ; 2. (stem cells) are {undifferentiated / unspecialised} / eq ; 3. can keep dividing / eq ;	**max (2)**

Question Number	Answer	Mark
8(b)(ii)	they can {give rise to / eq} white blood cells / eq ;	**(1)**

Question Number	Answer	Mark
8(b)(iii)	possible route to {infection / eq} / rejection by recipient / increased chance of becoming cancerous /eq ;	**(1)**

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