

**JUNE 2004**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK: 80**

**SYLLABUS/COMPONENT: 0610/03**

**BIOLOGY  
Paper 3 (Extended)**



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**Question 1**

- (a) plants/vegetation/producers/holophytes ; [1]  
Ⓡ grass/vegetables
- (b) jackals + lions ; BOTH NEEDED FOR THE MARK [1]
- (c) grass →sheep → jackal  
one mark for all organisms in correct order ;  
one mark for arrows correct ; [2]  
ⓐ grassland Ⓡ refs to plants
- (d) packs are more successful catching their prey AW ;  
animals may share food ;  
more likely to be successful in stealing food from lions ;  
packs are less prone to attack from predators ; [max. 1]
- (e) jackals also eat other animals ; Ⓡ have other food sources unqual.  
jackals kill sheep from other (unprotected) flocks ;  
other plausible reason ; [max. 1]
- (f) i. artery/suitable named artery ; Ⓡ aorta  
ii. vein/suitable named vein ;  
Ⓡ blood vessels unqual.  
iii. trachea/windpipe ; Ⓡ throat unqual.  
iv. spine/backbone/vertebrae ; Ⓡ bones in neck  
v. spinal cord/nerve ;  
vi. larynx/voice box/thyroid/epiglottis ;  
vii. oesophagus/gullet ;  
viii. lymph vessel/lymph gland ; [max. 2]
- (g) i. plastic may be non-biodegradable AW ;  
ii. so will result in + litter/land pollution/accumulation of waste/visual pollution ;  
iii. ref. to scavengers may choke on plastic AW ; ⓐ other viable ideas  
iv. ref. to air pollution if burned ; [max. 2]
- [max. 10]**

**Question 2**

- (a) a diet containing all + (essential) foodstuffs/nutrients AW ;  
in the correct + proportions/amounts ;  
ref. to the supply of the right amount of energy/to maintain health AW ; [max. 2]
- (b) carbohydrates ;  
fats ; [2]
- (c)(i) 1. Z ;  
2. Y ;  
3. X ; [3]

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- (ii) heart disease/heart attack ; ® heart problems unqual.  
stroke ;  
diabetes ;  
blindness ;  
high blood pressure ;  
varicose veins ; ① refs. to atherosclerosis etc  
breathing problems/easily tired ;  
arthritis ;  
back problems/joint problems AW ;  
loss of sex drive AW/ref. to depression ; [max. 2]
- (d) 1. simple sugars ;  
2. fatty acids ;  
glycerol ;  
3. amino acids ; [4]
- (e)(i) enzymes ; ① biological catalysts ® specific named enzymes [1]
- (ii) ACCEPT CONVERSE ARGUMENTS  
ref. to small molecules are soluble ; ① to make the molecules soluble  
small molecules can be absorbed or diffuse + through gut wall/into  
blood stream AW ;  
to provide basic units + for synthesis of different molecules AW/for a  
named process ; [max. 2]
- [max.16]**

### Question 3

- (a) 800 (cm<sup>3</sup>); (MARK IN TABLE OR IN SPACE) [1]
- (b) 1. lung(s) ;  
2. skin ; ® sweat gland  
3. kidney ;  
4. large intestine/colon ; [4]
- (c)(i) IF VOLUME IS WRONGLY STATED, REJECT EXPLANATION  
(SWEAT)  
(volume of sweat) would increase/ref. to more AW ;  
ref. to cooling effect/stop body overheating AW ; linked to first point [2]
- (URINE)  
(volume of urine) would decrease/ref. to less AW ;  
due to increase in sweat production/reduce chance of dehydration AW/  
less water in blood/to keep water in blood constant ;  
due to secretion of ADH/due to increased absorption in nephron ; [max. 2]
- (ii) homeostasis ; [1]
- (d) glucose ;  
pancreas ;  
secretion ;  
glycogen ;  
insulin ;  
liver ; [6]
- [max. 16]**

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#### Question 4

- (a) ref. to large numbers ;  
 ref. to large surface (area) ;  
 ref. to presence of mitochondria + to provide energy ;  
 Ⓐ other viable cell features [max. 2]
- (b)(i) absorption of a substance AW + into a cell/across a membrane AW ;  
 against/up + a concentration gradient ;  
 ref. to needing energy ; [2]
- (ii) active transport/active uptake + requires energy ; [1]
- (c)(i) i. ref. to tubular structure/elongated/long (cells) AW ;  
 ii. ref. to lack of cross-walls/open ended ;  
 iii. ref. to no (living) contents AW ; Ⓛ dead unqual.  
 iv. ref. to transport/passage/movement of + water/minerals ;  
 linked to i., ii. or iii.  
 v. ref. to thick/strong/lignified + (cell) walls ;  
 vi. ref. to support ; linked to v.  
 vii. ref. to pits ; [max. 3]
- (ii) i. ref. to transpiration/evaporation ;  
 ii. ref. to pull from above/pull from leaves AW ; Ⓛ pull unqual.  
 iii. ref. to water potential gradient AW ;  
 iv. ref. to capillarity/root pressure ;  
 v. ref. to cohesion AW ; [max. 2]
- [max. 10]

#### Question 5

- (a) i. ref. to greenhouse effect/carbon dioxide is a greenhouse gas ;  
 ii. details of greenhouse effect ;  
 iii. ref. to desertification/global warming/climate change/example ;  
 iv. ref. to more plants AW ; Ⓐ plants will produce more oxygen [max. 2]
- (b)(i) **ACCEPT ALTERNATIVE MARK SCHEME FOR TO NUCLEAR POWER**  
 i. ref. to burning/combustion + of fossil fuels ;  
 ii. produces sulphur dioxide ; Ⓜ gives off fumes unqual. Ⓛ nitrogen oxides  
 iii. (SO<sub>2</sub>) forms acid rain ; linked to ii.  
 iv. ref. to one form of damage by acid rain to plants/animals/buildings rocks ;  
 Ⓐ kills plants/fish  
 v. ref. to spoil heaps/open cast damage + as result of mining coal ;  
 vi. ref. to hot water effluent AW + damage to rivers AW ; [max. 3]

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**(ii) IGNORE REFS TO CARBON DIOXIDE**

- i. ref. to deforestation ;
- ii. could be replaced by monoculture ;
- iii. destruction of natural habitat(s) ;
- iv. ref. to disruption of food chain ;
- v. ref. to decreased + biodiversity/species or extinction of species ;
- vi. ref. to changes in rainfall/increase risk of flooding/disruption of water cycle ;
- vii. less transpiration so less water vapour in atmosphere ;
- viii. ref. to increased risk of soil erosion/ref. to silting of rivers ;
- ix. can result in desertification ;
- x. ref. to drop in atmospheric oxygen levels AW ;
- xi. ref. to particulates from burning wood or charcoal AW ;

[max. 3]

**(iii) IGNORE REFS TO CARBON DIOXIDE**

- i. ref. to combustion of petrol/diesel/gasoline or ref. to hot engine ;
- ii. produces oxides of nitrogen ; linked to i. @ nitrogen compounds
- iii. ref. to acid rain ; linked to ii.
- iv. ref. to one form of damage by acid rain to plants or animals ;
- v. ref. to lead in petrol AW/lead oxide/particulates in diesel ;
- vi. ref. to one effect of lead or particulates on humans ;
- vii. ref. to production of carbon monoxide ;
- viii. reduces oxygen carrying capacity of blood AW ; linked to vi.
- ix. ref. to noise pollution ;
- x. ref. to smog ;
- xi. ref. to animals killed by vehicles AW ;

[max. 3]

**[max. 11]****(b)(i) ALTERNATIVE MARK SCHEME FOR NUCLEAR POWER**

- i. ref. to nuclear power ;
- ii. ref. to escape of radiation AW ;
- iii. ref. to effect of radiation on animals/plants (cancer/leukemia/mutations/polyplody etc) ; @ kills animals/plants unqual.
- iv. ref. to problems with waste disposal or storage/risk of explosion or meltdown ;
- v. ref. to spoil heaps/open cast damage + as result of mining uranium ;
- vi. ref. to hot water effluent AW + damage to rivers AW ;

[max. 3]

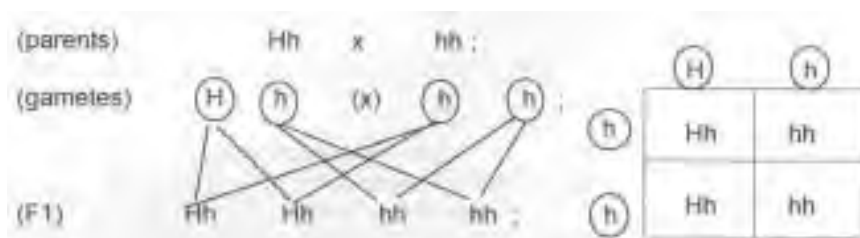
**Question 6****MARK F1 BASED ON GAMETES, EVEN IF PARENTS ARE WRONG**

[MAX. 1]

- (a)(i) MAX. TWO WITHOUT RATIO  
ACCEPT PUNNETT SQUARE**

**IF LINES ARE USED, THEY MUST  
BE CORRECT FOR F1 MARK**

**IF WRONG PARENTS ARE USED, AWARD 1 MAX. FOR CORRECT  
WORKING THROUGH TO F1**



ratio = 1 : 1/one long haired to one short haired AW/50 : 50 ;

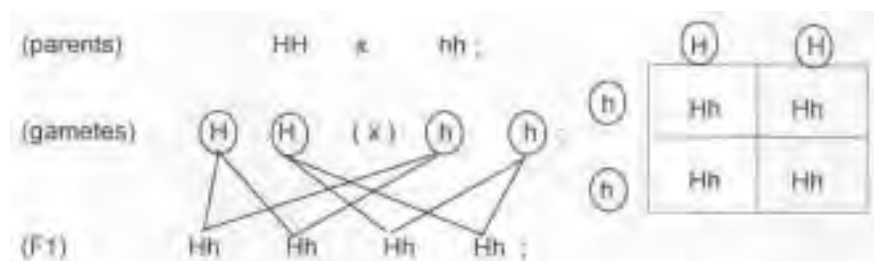
[max. 3]

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- (ii) MAX. **TWO** WITHOUT RATIO  
ACCEPT PUNNETT SQUARE

**IF LINES ARE USED, THEY MUST  
BE CORRECT FOR F1 MARK**

**IF WRONG PARENTS ARE USED, AWARD 1 MAX. FOR CORRECT WORKING  
THROUGH TO F1**



ratio = all short haired / 1 : 0 AW ;

[max. 3]

- (b) ref. to intermediate/medium + hair length AW ;  
Ⓜ mixture of hair lengths

[1]

[max. 7]

### Question 7

- (a) **ALL THREE NEEDED FOR THE MARK**  
**ASSUME ANSWER REFERS TO COLUSTRUM, IF NOT STATED**  
colostrum has: less fats + more protein + less sugar ;

[1]

Ⓐ figures for comparison

Ⓐ converse arguments

- (b) 2 x 10 ;  
= 20 g ; AWARD BOTH MARKS FOR CORRECT ANSWER ONLY

[2]

- (c)(i) any named citrus (drink)/blackcurrant juice ;

[1]

- (ii) i. ref. to sugar deposited on teeth ;  
ii. ref. to bacteria feed on sugar/respire sugar ;  
iii. produces acid ; linked to bacteria  
iv. (acid) attacks/reacts with/eats into/dissolves + teeth/enamel AW ;  
v. teat keeps sugars in contact with teeth AW ;

[max. 4]

- (d) ref. to anaemia/anaemic/pale appearance AW ;  
ref. to lacking energy/suffering from fatigue/tiredness AW ;  
Ⓜ weakness unqual.  
ref. to breathlessness ; Ⓜ breathing problems  
ref. to lack of resistance to disease ;

[max. 2]

[max. 10]