

GCE
AS and A Level

Human Biology

AS exams 2009 onwards
A2 exams 2010 onwards

Unit 2: **Specimen mark scheme**

Version 1.0





General Certificate of Education

Human Biology 2405

HBIO2 Why people are like they are

Mark Scheme

Specimen Paper

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Question 1

- | | | |
|--------------|--------------------------------------------------------------------|----------|
| (a) | Interphase; | 1 |
| (b) | D A C B; | 1 |
| (c) | Attachment of centromeres;
Separation of (daughter) chromatids; | 2 |
| Total | | 4 |

Question 2

- | | | |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| (a) | Eggs of Toxocara in dog faeces;
Some dog owners allow dogs to defaecate in parks/public places;
Increasing risk of contamination of people using the same spaces for recreation; | 3 |
| (b) | Very young children more likely to crawl on the ground/put (unwashed) fingers in their mouth; | 1 |
| Total | | 4 |

Question 3

- | | | |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| (a) | X , phosphate;
Y , deoxyribose/pentose/5-carbon sugar;
Z , (nitrogenous) base; (<i>accept named base</i>) | 3 |
| (b) | Hydrogen bond; | 1 |
| (c) | Adenine 28% (as thymine 28%)
Cytosine and guanine =44%;
Cytosine = 22%;
(<i>idea of equal amounts of T and A, C and G = 1 mark, correct answer = 2 marks</i>) | 2 |
| Total | | 6 |

Question 4

- (a) Similarity;
e.g. Both contain phosphate group/ pentose sugar/organic base;

Difference;
e.g. RNA contains ribose, DNA contains deoxyribose/ RNA contains Uracil, DNA contains Thymine/ RNA single strand, DNA double strand; 2 max
- (b) Double helix unzips/hydrogen bonds break;
Each single strand acts as a template;
Nucleotides bind to each template by specific base pairing;
(New) nucleotides are joined together by DNA polymerase;
Each new molecule has has one original strand and one new DNA strand; 4 max

Total 6**Question 5**

- (a) (i) (Australopithicine has) smaller canines/smaller incisors/larger molars; 1
- (ii) (Australopithicine has) gap between canines and incisors/diastema/larger molars; 1
- (b) Larger molar teeth;
Smaller canines so sideways movement is possible;
Diastema, to allow movement of food 'around' molars; 2 max

Total 4**Question 6**

- (a) Heavy smokers who take more than 4 drinks have biggest risk;
Drinking alcohol increases risk if above 4 drinks (all groups);
Smoking increases risk even if no alcohol is drunk;
1 -3 alcoholic drinks appears to lower risk in heavy smokers/ more than 40 cigarettes per day;
To less than those who take no alcohol; 4 max
- (b) Mutation of gene/other environmental factor/named factor; 1

Total 5

Question 7

- (a) C B A; 1
- (b) (i) Suitable suggestion; with evidence;
e.g. To cut/scrape meat from bones;
Cut marks on bone; 2
- (ii) Tooth marks under cut marks from tools;
So carnivore chewed on bone first; 2
- Total 5**

Question 8

Statement	<i>Homo habilis</i>	<i>Homo erectus</i>	<i>Homo sapiens</i>
Use of fire	✓	✓	✓ ;
Use of pebble tools (Oldowan culture)	✓		;
Use of hand axes (Acheulian culture)		✓	;
Tools made by striking flakes from a core			✓ ;
Production of cave art			✓ ;

5

Total 5**Question 9**

- (a) Absorb more sunlight;
Needed for vitamin D synthesis; 2
- (b) (i) Better diagnosis;
Better public awareness/more careful self checking;
Better treatment; 2
- (ii) Cancer cells killed (as have limited oxygen);
Normal body cells survive; 2
- Total 6**

Question 10

- (a) Skull/jawbone used to determine face shape;
Pelvis used to determine upright posture/bipedal;
Arm bones used to determine length of arms; 2 max
- (b) (i) 84.0 1
- (ii) Lack of fossils of relevant bone(s); 1
- (iii) Gives evidence about possible bipedalism; 1
- (c) Potassium argon dating/carbon dating/stratigraphy; 1
- Total 6**

Question 11

- (a) More reliable food supply;
Allowed population growth;
Led to settlements;
Production of surplus;
Start of trading;
Division of labour; 4 max
- (b) (i) Grains stayed on stalk during harvest/grains not lost; 1
- (ii) Selected cereals with strongest rachis;
Planted grains from these varieties;
Over several generations; 2
- Total 7**

Question 12

- (a) Impulses from inspiratory centre;
Cause contraction of intercostals and diaphragm muscles;
(So) air is breathed in;
(Stretch receptors in lungs) send impulses to inhibit inspiratory centre/no
impulses to /relaxation of diaphragm and intercostals muscles;
Expiratory centre no longer inhibited/ Air exhaled and lungs deflate;
Negative feedback produces a constant rate of breathing; 6 max
- (b) (i) Slow then rapid increase;
More pronounced at 6.0%/above 5.5%; 2
- (ii) Principal (calculation of total volume of air by multiplying depth by rate);
- Correct answer $\frac{(2100 \times 27) - (670 \times 14)}{(670 \times 14)} = 504\%$; 2
- Total 10**

Question 13

(a)

Kingdom	phylum	Class	Order	Family	Genus	Species
Animalia	Chordata	Mammalia	Carnivora	Canidae	<i>Vulpes</i>	<i>vulpes</i> ;

2

(b)

Juvenile characters;
 Broad skull;
 Floppy ears;
 Whining/barking;
 Tameness/docile/willing /friendly to handlers;

2 max

(c)

(i) Selected most tame males and females;
 In each generation;
 Bred from these individuals;
 Repeated over many generations;

4

(ii)

Not really because, reasons;;;;
 e.g. No other scientists able to repeat the experiment and breed tameness;
 Assumptions made about shape of head/floppy ears and tameness;
 Based upon observations in wolves (a different species);
 These correlations but no proven link to tameness;
 No control group of animals, kept in same conditions but not selected for tameness and breeding;

4 max

Total 12