



# **BIOLOGY 2016**

## **Unit 4**

### **Key Topic Test 7 – Human Evolution**

Recommended writing time\*: 45 minutes

Total number of marks available: 45 marks

## **SOLUTIONS**

**SECTION A: Multiple-choice questions (1 mark each)**

**Question 1**

*Answer: C*

*Explanation:*

Having a highly folded cerebral cortex is a characteristic found in the great ape lineage, not all primates.

**Question 2**

*Answer: C*

*Explanation:*

The presence of cooking tools does not suggest that only megafauna were hunted, the use of skins may have come from carcasses and not hunting directly. The markings on the bone fragments made by non-natural causes is the best possible answer.

**Question 3**

*Answer: B*

*Explanation:*

The multiregional theme suggests that there was consistent gene flow occurring between members of the *Homo erectus* genus. It is not suggested that they met in Africa to interbreed as D suggests.

**Question 4**

*Answer: D*

*Explanation:*

As cutting tools were not apparent in early *homo sapiens*, it would be more accurate that it has come from modern *homo sapiens*. The large brain cavity rules out the gorilla and chimpanzee.

**Question 5**

*Answer:* B

*Explanation:*

The larger gluteus maximus did not contribute to the straighter spine as other members of the primate family have small glutes with an upright spine. The tilting of the pelvis assists in the bi-pedal upright posture.

**Question 6**

*Answer:* B

*Explanation:*

The answer is evident on the graph.

**Question 7**

*Answer:* A

*Explanation:*

Having a larger brain requires a greater energy requirement, the smaller sharper teeth would have assisted animal consumption and therefore increased the amount of energy obtained for greater requirements. Molar teeth are more typically used for crushing vegetable matter.

**Question 8**

*Answer:* A

*Explanation:*

Brain size is not always correlated with levels of intelligence in an animal. A is the most reasonable response.

**Question 9**

*Answer:* B

*Explanation:*

Despite having a foramen magnum further forward lemurs, a primate are incapable of bi-pedalism. The position of the foramen magnum in the Homo sapiens genus assisted in greater upright position for bi-pedalism.

**Question 10**

*Answer: C*

*Explanation:*

It is theorised that humans and apes diverged from a common ancestor, not that humans diverged from apes. This is why there is no evidence of the link between humans and current apes.

**SECTION B – Short-answer solutions**

**Question 1**

**a.**

| <b>Divergence line</b> | <b>Notable characteristic (that distinguishes them from other lines listed)</b> |
|------------------------|---------------------------------------------------------------------------------|
| Human                  | Bi-pedalism                                                                     |
| Hominoids              | Broad chest and shoulders                                                       |
| New world primates     | Presence of a tail                                                              |

1 mark per correct box – total 3 marks

**b.** Chimpanzees and Bonobos

1 mark

AND

The phylogenetic tree shows these splitting at approximately 2 million years ago, the closest split to modern day.

1 mark

**c.** Differences in structural homology

1 mark

AND

DNA hybridisation

1 mark

AND

Amino acid comparison

1 mark

OR

*Any other reasonable response.*

- d. Climbing trees for shelter

1 mark

AND

Having greater contact with the ground surface to obtain better sensory feeling

1 mark

OR

*Any other reasonable response*

- e. To see over tall grasses

1 mark

AND

The ability to move long distances carrying objects

1 mark

OR

*Any other reasonable response*

Total 12 marks

## Question 2

- a. True

1 mark

AND

By examining skulls of primates it can be seen that there is a larger cavity for frontal lobe region.

1 mark

- b. True

1 mark

AND

Bipedalism would be needed on land in order to gain greater speed when moving to escape predators or forage for food.

1 mark

- c. False

1 mark

AND

Other hominins including Neanderthals were all capable of upright bi-pedal walking. Humans have been able to lengthen their spine to a greater capacity.

1 mark

- d. False

1 mark

AND

The earliest known tools predate human beginnings and are also used by monkeys to obtain foods such as nuts.

1 mark

e. False

1 mark

AND

Hominin encase a large lineage that also includes Neanderthals and Homo erectus

1 mark

Total 10 marks

**Question 3**

a. The development of storytelling as depicted by ancient art forms

1 mark

b. Attending dinner parties as seen in historical documents

1 mark

c. Cultural evolution changes from generation to generation.

1 mark

AND

Naturally selected evolutionary characteristics often take longer than a single generation to become apparent enough to cause evolution to fully occur within the species.

1 mark

d. The ability to stay and live in the one area created larger living communities

1 mark

AND

The development of trade practices with other communities

1 mark

*Any other reasonable response could be given to all of question 3*

**Question 4**

a. Out of Africa hypothesis

1 mark

AND

As Africans do not have any Neanderthal DNA present in their genome, it is suggested that Neanderthals met with humans after they left Africa and successfully interbreed in European and Asian regions.

1 mark

b. Divergent evolution from a common ancestor

1 mark

c. Neanderthals have a heavy brow ridge

1 mark

AND

A larger jaw and teeth composition in comparison to humans

1 mark

OR

*Any other reasonable response*

d. They are able to successfully interbreed to produce viable offspring

1 mark

e. The increase in globalisation and migration keeps the gene flow between the races consistent. This increases variation within the global gene pool.

1 mark