
BIOLOGY VCE UNITS 3&4 DIAGNOSTIC TOPIC TESTS 2017

TEST 8: DETERMINING RELATEDNESS BETWEEN SPECIES AND HUMAN CHANGE OVER TIME

SUGGESTED SOLUTIONS AND MARKING SCHEME

SECTION A – MULTIPLE-CHOICE QUESTIONS

Question 1 C

Fossils do not only include bones and not all are found within rock. Fossils are the preserved remains or traces of animals, plants and other organisms.

Question 2 B

A transitional fossil is any fossil which provides us with information about a transition from one species to another. Transitional fossils exhibit traits that are common to both an ancestral group and its descendant group.

Question 3 D

Trace fossils are any fossil that provides evidence of past life that is not the remains of the organism itself.

Question 4 D

Hard parts of organisms are more likely to be fossilised than soft parts.

Question 5 A

Conditions for fossilisation include rapid burial, lack of oxygen, lack of scavengers and detritivores.

Question 6 C

Fossils thought to be less than 50 000 years old can be dated using radioisotope carbon-14 which breaks down to nitrogen. The other radioisotopes have much longer half-lives and so are used to date much older fossils.

Question 7 C

Hominoids includes all apes, humans, and their close ancestors. Hominins includes humans and their close ancestors.

- d. *Any one of:*
- nucleotide sequences in DNA can be compared
 - amino acid sequences for proteins can be compared
- 1 mark
- e. Epidemiologists compare the mutations within a pathogen or pathogenic agent to work out when mutations have occurred and what strains of the disease have occurred in different locations and times.
- 1 mark

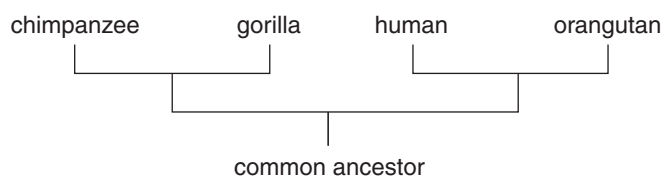
Question 4 (5 marks)

- a. A single gene whose expression is required to initiate activation of many other genes which together lead to development of a specific tissue, organ or structure.
- 1 mark
- b. BMP4 is acting as a master gene.
- 1 mark
- The expression of BMP4 regulates the expression of different genes in the different species.
- 1 mark
- This leads to different proteins being produced and different end products in terms of structural morphology.
- 1 mark
- c. *Any one of:*
- abnormal bone development
 - abnormal skull shape
 - abnormal vertebral column
 - orofacial cleft (cleft lips or cleft palate)
 - microphthalmia
- 1 mark

Question 5 (6 marks)

- a. Hominidae have arms shorter than legs, whereas Pongidae have longer arms than legs.
- 1 mark
- Hominidae have a rounded pelvis whereas Pongidae have an elongated pelvis.
- 1 mark
- Note: Students must include both for full marks.*
- b. *Any one of:*
- enamel on molar teeth
 - sinuses in bones of forehead
 - brow ridges
- 1 mark

- c. *For example (brow ridges):*



- d. chimpanzee
- 1 mark

- e. Phenotypic characteristics may be similar due to similar selective pressures in the environment, and thus may not be the result of common ancestry. Alternatively, while DNA is subject to mutation, it is still reliable in showing evolutionary relationships. 1 mark

Question 6 (3 marks)

- a. The 'new' fossil of modern man found in the Middle East pre-date those of modern man found in Europe. 1 mark
- b. The information suggests that Neanderthals migrated from Europe to the Middle East. 1 mark
- c. no
Modern human fossil remains have been found that are older than the oldest Neanderthal remains and Neanderthals appear to have evolved in Europe unlike modern man. 1 mark