

Biomedical Admissions Test (BMAT)

Section 2: Biology

Questions by Topic

B7 - Variation

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B7: Variation - Questions by Topic

(Mark Scheme and explanations at the end)

- 1 Here are four statements about evolution and natural selection.
- 1 Evolution is the slow process whereby organisms change over many generations.
 - 2 Natural selection is the slow process whereby organisms change over many generations.
 - 3 Natural selection is the mechanism of survival of the fittest by which evolution occurs.
 - 4 Evolution is the mechanism of survival of the fittest by which natural selection occurs.

Which of them are correct?

- A 1 and 2 only
 - B 1 and 3 only
 - C 3 and 4 only
 - D None of the statements
- 2 Which of the following is a definition of an advantageous allele?
- A A section of DNA which codes for a particular protein.
 - B A mutation which leads to an advantageous gene.
 - C A gene which codes for an advantageous phenotype.
 - D A gene which becomes more prevalent in a population of a species.
 - E A phenotype which makes it more likely an organism will survive and reproduce.
- 3 Which of the following statements is not true of antibiotic resistance?
- A There is variation of alleles in a population of bacteria.
 - B The selection pressure is often antibiotic usage.
 - C Bacteria with a beneficial allele will reproduce and pass on the characteristic of resistance.
 - D The allele for antibiotic resistance increasing in the population is known as natural selection.
 - E Variation in the bacteria population is due to mutation.





4 Which of the following is not caused solely by genetic factors?

- A Blood group
- B Cystic Fibrosis
- C Skin colour
- D Eye colour
- E Polydactyly

5 A person has a body mass index of 33.5. This is classified as obese.

Which of the following is this caused by?

- A Genetic factors only
- B Environmental factors only
- C Diet and lack of exercise only
- D A combination of genetics and environmental factors



Answers and Explanations

- 1 **B is the answer.** **Evolution** is the slow process whereby organisms change over many generations. **Natural selection** is the mechanism by which it occurs.

Statement 1 is a correct definition for evolution.

Statement 2 describes evolution but says it is natural selection.

Statement 3 is a correct definition for natural selection

Statement 4 describes natural selection but says it is evolution.

- 2 **C is the answer.** This accurately describes an allele – one version of a gene – and the ‘advantageous’ aspect in that it codes for a beneficial phenotype.

- A** is incorrect because it gives the definition of a **gene**.
- B** is incorrect as it is the process by which variation (and so beneficial alleles) occur.
- D** is incorrect because it describes evolution to increase the prevalence of a beneficial allele rather than what a beneficial allele is.
- E** is a description of the survival advantage resulting from a beneficial allele causing a beneficial phenotype than the beneficial allele.

- 3 **D is the answer.** This statement describes evolution rather than natural selection.

- A** is true because variation does exist in a bacterial population.
- B** is true as the selection pressure is the introduction of the antibiotic.
- C** is true because individuals with the beneficial allele will survive to reproductive age and pass on their genes to the next generation.
- E** is true because mutations are the cause of variation.

- 4 **C is the answer.** Skin colour is affected not just by genetic factors but also environmental factors such as the level of sunlight.

A, B, D, and E are all illnesses or characteristics which are caused only by inheritance of specific alleles.





5 D is the correct answer. Both height and weight (the two components of BMI) are controlled by a combination of genetic and environmental factors.

A is incorrect because there is an environmental component such as diet and exercise levels.

B and C are incorrect because both describe only environmental factors being involved, ignoring the effect that genetics have on maximum height and body mass.

