

# Self-test questions

## Topic 10

- 1 Crossing over is the exchange of genetic material between which structures?
  - A homologous chromosomes
  - B sex chromosomes
  - C non-sister homologous chromatids
  - D sister homologous chromatids
- 2 Independent assortment of genes is due to:
  - A random orientation of pairs of homologous chromosomes during meiosis I
  - B chiasmata formation between non-sister chromatids
  - C separation of sister chromatids during anaphase II
  - D segregation of unlinked genes during meiosis
- 3 If a cross is performed between two organisms with the genotypes **TtGg** and **ttgg**, what genotypes in the offspring would occur as a result of recombination?
  - A **Ttgg, TtGg**
  - B **TtGg, ttgg**
  - C **Ttgg, Ttgg**
  - D **Ttgg, ttGg**
- 4 Which of the following controls human height?
  - A polygenic inheritance
  - B multiple alleles
  - C codominance
  - D recessive alleles
- 5 In the F<sub>2</sub> generation of a dihybrid cross:
  - A four phenotypes appear in a ratio of 9 : 3 : 3 : 1 if the loci are linked
  - B four phenotypes appear in a ratio of 9 : 3 : 3 : 1 if the loci are unlinked
  - C two phenotypes appear in the ratio of 3 : 1 if the loci are unlinked
  - D three phenotypes appear in the ratio 1 : 2 : 1 if the loci are unlinked
- 6 A red-flowered (**RR**) plant is crossed with a white-flowered plant (**rr**) and produces pink-flowered offspring (**Rr**).  
In the same species, tall (**T**) is dominant to dwarf (**t**).  
What is the phenotypic ratio produced from a cross of **Rrtt rrTt**?
  - A 9 : 3 : 3 : 1
  - B 50% pink, 50% white and all tall plants
  - C 1 : 1 : 1 : 1 (25% tall pink, 25% dwarf pink, 25% tall white, 25% dwarf white)
  - D 3 : 1
- 7 Which type of selection is shown if a population of seed-cracking birds contains large and small beak sizes but no medium-sized beaks?
  - A directional
  - B stabilising
  - C disruptive
  - D unnatural

- 8 Which of the following can lead to reproductive isolation of a population?
- i** organisms breed at different times
  - ii** organisms develop different mating behaviour
  - iii** an earthquake separates part of the population from the original population
- A** i only  
**B** i and ii only  
**C** ii and iii only  
**D** i, ii and iii
- 9 Gene flow is defined as:
- A** migration of individuals between populations
  - B** transfer of genes within a population
  - C** movement of alleles between populations
  - D** variation of alleles within a population
- 10 The most common circumference of acorns in a population of oak trees is 2 cm. What would the most common circumference(s) be after 10 generations of stabilising selection?
- A** 2 cm
  - B** greater than 2 cm
  - C** greater than 2 cm and less than 2 cm
  - D** less than 2 cm