

## Multiple Choice Questions

- 1. Exchange of genetic material takes place in
  - (a) vegetative reproduction
  - (b) asexual reproduction
  - (c) sexual reproduction
  - (d) budding
- **2.** Two pink coloured flowers on crossing resulted in 1 red, 2 pink and 1 white flower progeny. The nature of the cross will be
  - (a) double fertilisation
  - (b) self pollination
  - (c) cross fertilisation
  - (d) no fertilisation
- **3.** A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because
  - (a) tallness is the dominant trait
  - (b) shortness is the dominant trait
  - (c) tallness is the recessive trait
  - (d) height of pea plant is not governed by gene 'T' or 't'
- **4.** Which of the following statement is incorrect?
  - (a) For every hormone there is a gene.
  - (b) For every protein there is a gene.
  - (c) For production of every enzyme there is a gene.
  - (d) For every molecule of fat there is a gene
- **5.** If a round, green seeded pea plant (RR yy) is crossed with wrinkled, yellow seeded pea plant, (rr YY) the seeds produced in  $F_1$  generation are
  - (a) round and yellow
  - (b) round and green
  - (c) wrinkled and green
  - (d) wrinkled and yellow

- **6.** In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are
  - (i) large chromosome
  - (ii) small chromosome
  - (iii) Y-chromosome
  - (iv) X-chromosome
  - (a) (i) and (ii)
- (b) (iii) only
- (c) (iii) and (iv)
- (d) (ii) and (iv)
- **7.** The maleness of a child is determined by
  - (a) the X chromosome in the zygote
  - (b) the Y chromosome in zygote
  - (c) the cytoplasm of germ cell which determines the sex
  - (d) sex is determined by chance
- **8.** A zygote which has an X-chromosome inherited from the father will develop into a
  - (a) boy
  - (b) girl
  - (c) X- chromosome does not determine the sex of a child
  - (d) either boy or girl
- **9.** Select the incorrect statement
  - (a) Frequency of certain genes in a population change over several generations resulting in evolution
  - (b) Reduction in weight of the organism due to starvation is genetically controlled
  - (c) Low weight parents can have heavy weight progeny
  - (d) Traits which are not inherited over generations do not cause evolution
- 10. New species may be formed if
  - (i) DNA undergoes significant changes in germ cells
  - (ii) chromosome number changes in the gamete
  - (iii) there is no change in the genetic material
  - (iv) mating does not take place
  - (a) (i) and (ii)
- (b) (i) and (iii)
- (c) (ii), (iii) and (iv)
- (d) (i), (ii) and (iii)
- **11.** Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce  $F_1$  progeny that have round, yellow (RrYy) seeds. When  $F_1$  plants are selfed, the  $F_2$  progeny will have new combination of characters. Choose the new combination from the following

- (i) Round, yellow
- (ii) Round, green
- (iii) Wrinkled, yellow
- (iv) Wrinkled, green
- (a) (i) and (ii)
- (b) (i) and (iv)
- (c) (ii) and (iii)
- (d) (i) and (iii)
- **12.** A basket of vegetables contains carrot, potato, radish and tomato. Which of them represent the correct homologous structures?
  - (a) Carrot and potato
  - (b) Carrot and tomato
  - (c) Radish and carrot
  - (d) Radish and potato
- **13.** Select the correct statement
  - (a) Tendril of a pea plant and phylloclade of *Opuntia* are homologous
  - (b) Tendril of a pea plant and phylloclade of Opuntia are analogous
  - (c) Wings of birds and limbs of lizards are analogous
  - (d) Wings of birds and wings of bat are homologous
- **14.** If the fossil of an organism is found in the deeper layers of earth, then we can predict that
  - (a) the extinction of organism has occurred recently
  - (b) the extinction of organism has occurred thousands of years ago
  - (c) the fossil position in the layers of earth is not related to its time of extinction
  - (d) time of extinction cannot be determined
- **15.** Which of the following statements is not true with respect to variation?
  - (a) All variations in a species have equal chance of survival
  - (b) Change in genetic composition results in variation
  - (c) Selection of variants by environmental factors forms the basis of evolutionary processes.
  - (d) Variation is minimum in asexual reproduction
- 16. A trait in an organism is influenced by
  - (a) paternal DNA only
  - (b) maternal DNA only
  - (c) both maternal and paternal DNA
  - (d) neither by paternal nor by maternal DNA

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- **17.** Select the group which shares maximum number of common characters
  - (a) two individuals of a species
  - (b) two species of a genus
  - (c) two genera of a family
  - (d) two genera of two families
- **18.** According to the evolutionary theory, formation of a new species is generally due to
  - (a) sudden creation by nature
  - (b) accumulation of variations over several generations
  - (c) clones formed during asexual reproduction
  - (d) movement of individuals from one habitat to another
- **19.** From the list given below, select the character which can be acquired but not inherited
  - (a) colour of eye
  - (b) colour of skin
  - (c) size of body
  - (d) nature of hair
- **20.** The two versions of a trait (character) which are brought in by the male and female gametes are situated on
  - (a) copies of the same chromosome
  - (b) two different chromosomes
  - (c) sex chromosomes
  - (d) any chromosome
- **21.** Select the statements that describe characteristics of genes
  - (i) genes are specific sequence of bases in a DNA molecule
  - (ii) a gene does not code for proteins
  - (iii) in individuals of a given species, a specific gene is located on a particular chromosome
  - (iv) each chromosome has only one gene
  - (a) (i) and (ii)
- (b) (i) and (iii)
- (c) (i) and (iv)
- (d) (ii) and (iv)
- **22.** In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in  $F_0$  is
  - (a) 1:3
  - (b) 3:1
  - (c) 1:1
  - (d) 2:1

- 23. The number of pair (s) of sex chromosomes in the zygote of humans is
  - (a) one
- (b) two
- (c) three
- (d) four
- **24.** The theory of evolution of species by natural selection was given by
  - (a) Mendel
- (b) Darwin
- (c) Morgan
- (d) Lamarck
- **25.** Some dinosaurs had feathers although they could not fly but birds have feathers that help them to fly. In the context of evolution this means that
  - (a) reptiles have evolved from birds
  - (b) there is no evolutionary connection between reptiles and birds
  - (c) feathers are homologous structures in both the organisms
  - (d) birds have evolved from reptiles

## Short Answer Questions

- **26.** How is the sex of a newborn determined in humans?
- **27.** Do genetic combination of mothers play a significant role in determining the sex of a new born?
- **28.** Mention three important features of fossils which help in the study of evolution.
- **29.** Why do all the gametes formed in human females have an X chromosome?
- **30.** In human beings, the statistical probability of getting either a male or female child is 50 : 50. Give a suitable explanation.
- **31.** A very small population of a species faces a greater threat of extinction than a larger population. Provide a suitable genetic explanation.
- **32.** What are homologous structures? Give an example. Is it necessary that homologous structures always have a common ancestor?
- **33.** Does the occurrence of diversity of animals on earth suggest their diverse ancestry also? Discuss this point in the light of evolution.
- **34.** Give the pair of contrasting traits of the following characters in pea plant and mention which is dominant and recessive
  - (i) yellow seed
- (ii) round seed
- **35.** Why did Mendel choose pea plant for his experiments?

**36.** A woman has only daughters. Analyse the situation genetically and provide a suitable explanation.

## Long Answer Questions

- **37.** Does geographical isolation of individuals of a species lead to formation of a new species? Provide a suitable explanation.
- **38.** Bacteria have a simpler body plan when compared with human beings. Does it mean that human beings are more evolved than bacteria? Provide a suitable explanation.
- **39.** All the human races like Africans, Asians, Europeans, Americans and others might have evolved from a common ancestor. Provide a few evidences in support of this view.
- **40.** Differentiate between inherited and acquired characters. Give one example for each type.
- **41.** Give reasons why acquired characters are not inherited.
- **42.** Evolution has exhibited a greater stability of molecular structure when compared with morphological structures. Comment on the statement and justify your opinion.
- **43.** In the following crosses write the characteristics of the progeny

Cross	Progeny
(a) RR YY x RR YY Round, yellow Round, yellow	
(b) Rr Yy x Rr Yy	
Round, yellow Round, yellow (c) rr yy x rr yy	
wrinkled, green wrinkled, green (d) RR YY x rr yy	
Round, yellow wrinkled green	•••••

**44.** Study the following cross and showing self pollination in F<sub>1</sub>, fill in the blank and answer the question that follows

Parents	RRYY	X	rryy
	Round, yellow		wrinkled, green
$F_1$ —	Rr Yy	X	?
	Round, yellow		

- **45.** In question 44, what are the combinations of character in the  $F_2$  progeny? What are their ratios?
- **46.** Give the basic features of the mechanism of inheritance.
- **47.** Give reasons for the appearance of new combinations of characters in the  $F_9$  progeny.