

**PRACTICE EXERCISE – 1**

- Q 1. What is a gene?
- Q 2. Give one point difference between Heredity and variation.
- Q 3. What is the effect of DNA copying which is not perfectly accurate on the reproduction process?
- Q 4. Name the organisms which are now extinct and are studied from their fossils.
- Q 5. Will geographical isolation be a major factor in speciation of sexually reproducing animals? Give reasons for your answer.
- Q 6. When tall pea plants of genotype TT is cross-bred with dwarf pea plants having genotype tt, what will be the genotypic ratio obtained?
- Q 7. The human hand, cat paw and the horse foot, when studied in detail show the same structure of bones and point towards a common origin. What is the term given to such structures?
- Q 8. In the F<sub>2</sub> generation of a cross, progeny having different parts are produced in the ratio 3: 1. State whether it is a monohybrid cross or dihybrid cross.
- Q 9. What do you understand by term heredity?
- Q 10. What constitutes the link between one generation and the next?
- Q 11. What are fossils? What do they tell about the process of evolution?
- Q 12. Differentiate between Analogous and Homologous organs.
- Q 13. Define variation in relation to a species. Why is variation beneficial to the species?
- Q 14. Differentiate between Dominant trait and Recessive trait.
- Q 15. "The sex of the children is determined by what they inherit from their father and not the mother". Justify.
- Q 16. Differentiate between Acquired traits and Inherited traits.
- Q 17. Explain with the help of diagram Mendel's monohybrid cross.
- Q 18. What is sex determination? Explain the mechanism of sex determination in human beings?
- Q 19. What is speciation? Explain with example the generation of new species.
- Q 20. What are fossils? How can we find the age of fossils? How do fossils form layer by layer?
- Q 21. Who proposed the theory of natural selection?
- Q 22. Which chromosomes are responsible for sex determination?
- Q 23. Write the names of two types of chromosomes found in an organism.
- Q 24. What is sex chromosome?
- Q 25. Define mutation.
- Q 26. What are fossils?
- Q 27. What are the causes of variations?

## MULTIPLE CHOICE QUESTION'S

- Q1.** When two parents are crossed, the offspring are referred to as:
- (a) recessives (b) test cross (c) F<sub>1</sub> generation (d) F<sub>2</sub> generation
- Q2.** A cross between two individuals results in a ratio of 9: 3: 3: 1 for four possible phenotypes of progeny. This is an example of a:
- (a) dihybrid cross (b) monohybrid cross (c) test cross (d) none of these
- Q3.** For his experiments on heredity, Mendel used:
- (a) papaya plants (b) potato plants (c) pea plants (d) pear plants
- Q4.** The human animal which has an XY pair of chromosomes is called:
- (a) male (b) hybrid (c) female (d) doomed
- Q5.** The science of heredity is known as:
- (a) biology (b) embryology (c) genetics (d) biochemistry
- Q6.** A gene is a:
- (a) hybrid (b) heritable trait (c) pure breed (d) part of chromosome that transmits a trait
- Q7.** A normal cell of human body contains 23 pairs of chromosomes. The number of chromosomes in a sex cell (sperm or ovum) of a human being is most likely to be:
- (a) 46 (b) 23 (c) 21 (d) 42
- Q8.** In order to ensure that he had pure-breeding plants for his experiments, Mendel:
- (a) cross-fertilised each variety with each other (b) let each variety self fertilise for several generations (c) removed the female parts of the plants (d) removed the male parts of the plants
- Q9.** In the human blood grouping, the four basic blood types are type A, type B, type AB, and type O. The blood proteins A and B are:
- (a) simple dominant and recessive traits (b) codominant traits (c) sex-linked traits (d) incomplete dominant traits
- Q10.** A plant with two 'small' genes breeds with a plant with two 'tall' genes to produce:
- (a) small plants and tall plants in the ratio 1: 3 (b) all small plants (c) all tall plants (d) tall plants and small plants in the ratio 3: 1
- Q11.** A pregnant woman has an equal chance of her baby being blood group A or blood group AB. Which one of the following shows the possible genotypes of the woman and the father of her child?
- (a) I<sup>A</sup> I<sup>A</sup> and I<sup>B</sup> I<sup>O</sup> (b) I<sup>A</sup> I<sup>B</sup> and I<sup>B</sup> I<sup>O</sup> (c) I<sup>A</sup> I<sup>O</sup> and I<sup>B</sup> I<sup>O</sup> (d) I<sup>A</sup> I<sup>B</sup> and I<sup>A</sup> I<sup>O</sup>
- Q12.** The palisade cells of a species of plant contain 28 chromosomes. How many chromosomes will there be in each gamete produced by the plant?
- (a) 56 (b) 28 (c) 14 (d) 4
- Q13.** Which of the following may be used to obtain an F<sub>2</sub> generation?
- (a) allowing flowers on a parent plant to be self-pollinated (b) allowing flowers on an F<sub>1</sub> plant to be self-pollinated (c) cross-pollinating an F<sub>1</sub> plant with a parent plant (d) cross-pollinating two parent plants
- Q14.** The following results were obtained by a scientist who crossed the F<sub>1</sub> generation of pure-breeding parents for round and wrinkled seeds.
- |                                 |   |                |
|---------------------------------|---|----------------|
| Dominant trait                  | – | Round seeds    |
| Recessive trait                 | – | Wrinkled seeds |
| No. of F <sub>2</sub> offspring | – | 7524           |
- From these results, it can be concluded that the actual number of round seeds he obtained was:
- (a) 1881 (b) 22572 (c) 2508 (d) 5643

- Q15.** The visible characteristic in an organism is known as:  
(a) prototype (b) stereotype  
(c) phenotype (d) genotype
- Q16.** The exchange of genetic material takes place in:  
(a) vegetative reproduction  
(b) asexual reproduction  
(c) sexual reproduction  
(d) budding
- Q17.** A cross between a tall plant (TT) and short 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 plant is not governed by gene T or t
- Q18.** The number of pair(s) of sex chromosomes in the zygote of humans is:  
(a) one (b) two  
(c) three (d) four
- Q19.** In peas, a pure tall plant (TT) is crossed with a pure short plant (tt). The ratio of pure tall plants to pure short plants in  $F_2$  generation will be:  
(a) 1:3 (b) 3:1  
(c) 1:1 (d) 2:1
- Q20.** 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) sex chromosomes  
(c) two different chromosomes  
(d) any chromosomes
- Q21.** 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)
- Q22.** Select the group which shares the 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
- Q23.** 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
- Q24.** In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosomes 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)
- Q25.** The sex of a child is determined by which of the following?  
(a) the length of the mother's pregnancy  
(b) the length of time between ovulation and copulation  
(c) the presence of an X chromosome in a sperm  
(d) the presence of a Y chromosome in a sperm
- Q26.** A zygote which has inherited an X chromosome from the father will develop into:  
(a) baby boy  
(b) baby girl  
(c) adult  
(d) either boy or girl
- Q27.** 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 type of fat there is a gene
- Q28.** If the ratio of each phenotype of the seeds of pea plants in the  $F_2$  generation is 9:3:3:1, it is known as  
(a) tetrahybrid ratio

- (b) monohybrid ratio  
(c) dihybrid ratio  
(d) trihybrid ratio
- Q29.** In evolutionary terms, we have more in common with:  
(a) a chinese school boy  
(b) a chimpanzee  
(c) a spider  
(d) a bacterium
- Q30.** The human species has genetic roots in:  
(a) America (b) Africa  
(c) Australia (d) Antarctica
- Q31.** Which of the following gas was not present in early earth atmosphere?  
(a) Ammonia (b) Oxygen  
(b) Hydrogen sulphide (d) Methane
- Q32.** A gradual change, over a long period, in a form of life is known as:  
(a) erosion (b) evolution  
(b) revolution (d) evaluation
- Q33.** Scientists believe that all life originated in:  
(a) the sea (b) the soil  
(c) the ground (d) the air
- Q34.** According to scientists, aves have evolved from  
(a) mammals (b) amphibians  
(c) reptiles (d) arthropods
- Q35.** The theory of evolution of species by natural selection was given by:  
(a) Mendel (b) Darwin  
(c) Dalton (d) Lamarck
- Q36.** The term 'father of genetics' is used for the scientist:  
(a) Morgan (b) Mendel  
(c) Darwin (d) Marie Curie
- Q37.** One of the following traits cannot be inherited. This one is:  
(a) colour of eyes (b) colour of skin  
(c) size of body (d) nature of hair
- Q38.** Only one of the following characteristic of the parents can be inherited by their children. This one is:  
(a) deep scar on chin  
(b) snub nose  
(c) technique of swimming  
(d) cut nose
- Q39.** The organs which perform different functions but have the same basic structure are known as:  
(a) homologous organs  
(b) ananalogous organs  
(c) homolytic organs  
(d) analytic organs
- Q40.** The organs which perform similar functions but have different basic structure are called:  
(a) asymmetric organs  
(b) analogous organs  
(c) homologous organs  
(d) homophonic organs
- Q41.** Wing of an insect and forelimb of a bird are:  
(a) ananalogous organs (b) analeptic organs  
(c) homologous organs  
(d) homophobic organs
- Q42.** 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 thousand 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
- Q43.** Which of the following statement is incorrect with respect to variations?  
(a) all variations in a species have equal chance of survival  
(b) change in genetic composition results in variations  
(c) selection of variations by environmental factors forms the basis of evolutionary process  
(d) variations are the minimum in asexual reproduction
- Q44.** One of the following traits of the parents cannot be passed on to their future generations. This trait is:  
(a) cleft chin (b) pointed chin  
(c) scarred chin (d) broad chin

**Q45.** 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

**Q46.** Select the incorrect statement from the following:

- (a) frequency of certain genes in a population changes over several generations resulting in evolution
- (b) reduction in the weight of an 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

**Q47.** 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)

**Q48.** 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.

**Q49.** The presence of which of the following types of organs in two animals indicates that they are not derived from a common ancestor?

- (a) homologous organs
- (b) excretory organs
- (c) analogous organs

(d) reproductive organs

**Q50.** The presence of which of the following types of organs in two organisms indicates that they are derived from the same ancestor?

- (a) analogous organs
- (b) respiratory organs
- (c) digestive organs
- (d) homologous organs

### ANSWERS

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (a)  | 3. (c)  | 4. (a)  | 5. (c)  |
| 6. (d)  | 7. (b)  | 8. (b)  | 9. (c)  | 10. (c) |
| 11. (a) | 12. (c) | 13. (b) | 14. (d) | 15. (c) |
| 16. (c) | 17. (a) | 18. (a) | 19. (c) | 20. (a) |
| 21. (b) | 22. (a) | 23. (c) | 24. (c) | 25. (d) |
| 26. (b) | 27. (d) | 28. (c) | 29. (b) | 30. (b) |
| 31. (b) | 32. (b) | 33. (a) | 34. (c) | 35. (b) |
| 36. (b) | 37. (c) | 38. (b) | 39. (a) | 40. (b) |
| 41. (a) | 42. (b) | 43. (a) | 44. (c) | 45. (d) |
| 46. (b) | 47. (a) | 48. (b) | 49. (c) | 50. (d) |