

Chapter - (Heredity And Evolution)**Topic - 1 (Heredity And Mendel's Contribution)****Very Short Answer Type Questions**

Q.1. What is DNA?

Q.2. How many pairs of chromosomes are present in human beings?

Q.3. Where is DNA found in a cell?

Q.4. What is heredity?

Q.5. Name the information source for making proteins in the cells.

Q.6. Give the respective scientific terms used for studying:

(i) The mechanism by which variations are created and inherited and

(ii) The development of new type of organisms from the existing ones.

Q.7. No two individuals are absolutely alike in population. Why?

Q.8. How does comparing the DNA of different species helps in evolutionary studies?

Q.9. How do genes control traits?

Q.10. When a black guinea pig is crossed with a white guinea pig, what coloured guinea pigs are obtained in F_1 if black colour is dominant over white?

Q.11. In a cross between a tall pea plant (TT) and a short Pea plant (tt), what will be the characteristics shown by the F_1 generation?

Q.12. If the weight of an elephant is reduced because of starvation, the progeny elephants will not have low weight. Give reason.

Q.13. In a cross between round yellow seeds (RRYY) and wrinkled green seeds (rryy) of pea plant, what is the ratio of plants obtained in F_2 generation?

Q.14. In turtle, high incubation temperature leads to the development of female offspring. On the other hand in lizards, high incubation temperature leads to the development of male offspring. What determines the sex of the offspring in these examples?

Q.15. What is a gene?

Short Answer Type Questions – I

- Q.1. What are characteristics? Give an example.
- Q.2. Where are the genes located ? What is the chemical nature of gene?
- Q.3. Why will each gamete contain only one gene set?
- Q.4. Organisms showing asexual reproduction show very little variation from each other. Why?
- Q.5. “The chromosome number of the sexually reproducing parents and their offspring is the same.” Justify this statement.
- Q.6. What is the difference between F_1 generation and F_2 generation?
- Q.7. During crossing, why do new features which are not present in the parents appear in the offsprings?
- Q.8. Why cannot the experiences of an individual during its lifetime be passed on to its progeny?
- Q.9. Why are traits acquired during lifetime of an individual not inherited?
- Q.10. How is the equal genetic contribution of male and female parents ensured in the progeny?
- Q.11. If a trait A exists in 10% of a population of an asexually reproducing species and a trait B exists in 60% of the same population, which trait is likely to have arisen earlier?
- Q.12. A man with blood group A marries with a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits – blood group A or O is dominant? Why or why not?

Short Answer Type Questions – II

- Q.1. Explain Mendel's experiment with peas on inheritance of characters considering only one visible contrasting character.
- Q.2. List two differences in tabular form between dominant trait and recessive traits. What percentage / Proportion of the plants in the F_2 generation / progeny were round, in Mendel's cross between round and wrinkled pea plants?
- Q.3. How do Mendel's experiment show that traits are inherited independently?
- Q.4. List in tabular form, two distinguishing features between the acquired traits and the inherited traits with one example of each.
- Q.5. What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained.

Q.6. “We cannot pass on to our progeny the experiences and qualifications earned during our lifetime .” Justify the statement giving reason and examples.

Q.7. “It is possible that a trait is inherited but may not be expressed.” Give a suitable example to justify this statement.

Q.8. What is DNA copying? State its importance.

Q.9. “A trait may be inherited, but may not be expressed”. Justify this statement with the help of a suitable example.

Q.10. It is a matter of chance whether a couple will give birth to a male child or a female child.” Justify this statement with the help of a flow chart showing the fusion of sex chromosomes.

OR

How sex is determined in human beings?

Q.11. In human beings, the statistical probability of getting either a male or a female child is 50%. Give reasons and explain with the help of a diagram.

Q.12. How do Mendel’s experiments show that traits may be dominant or recessive?

Q.13. (i) Define Genetics.

(ii) Who is regarded as the ‘Father of Genetics’? Name the plant on which he performed his experiment.

(iii) Why did he selected that specific plant for his experiments?

Q.14. (i) Name the unit inheritance. What is its functions?

(ii) How are inherited traits different from acquired traits? Give example.

Q.15. Show inheritance of two characters over two generations by making a cross between round and yellow seeded plant (RRYY) with wrinkled green seeded plant (rryy).

Q.16. In a cross between plants with purple flowers and plants with white flowers the offsprings of F_1 generation all had white flowers. When the F_1 generation was self-crossed, it was observed in the F_2 generation that out of 100, 75 flowers were white. Make a cross and answer the following:

(i) What are the genotypes of the F_2 progeny?

(ii) What is the ratio of ‘White : Purple’ flowers in the F_2 generation?

Q.17. In one of his experiments with pea plants Mendel observed that when a pure tall pea plant is crossed with a pure dwarf pea plant. In the first generation, F_1 only tall plants appear.

(i) What happens to the traits of the dwarf plants in this case?

(ii) When the F_1 generation plants were self-fertilised, he observed that in the plants of second generation, F_2 both tall plants and dwarf plants were present. Why it happened ? Explain briefly.

Q.18. List three distinguishing features, in tabular form, between acquired traits and the inherited traits.

Q.19. How did Mendel interpret his result to show that traits may be dominant or recessive? Describe briefly.

Q.20. In a monohybrid cross between tall pea plants (TT) and short pea plants (tt) a scientist obtained only tall pea plants (Tt) in the F_1 generation. However, on selfing the F_1 generation pea plants, he obtained both tall and short plants in F_2 generation. On the basis of above observations with other angiosperms also, can the scientist arrive at a law? If yes, explain the law. If not, give justification for your answer.

Q.21. 'Different species use different strategies to determine sex of a newborn individual. It can be environmental cues or genetically determined.' Explain the statement by giving example for each strategy.

Q.22. What will happen if both the characters present in F_1 generation pass together in F_2 generation.

Q.23. A pea plant with blue colour flower denoted by BB is cross-bred with a pea plant with white flower denoted by ww.

(i) What is the expected colour of the flowers in their F_1 progeny?

(ii) What will be the percentage of plants bearing white flower in F_2 generation, when the flowers of F_1 plants were selfed?

(iii) State the expected ratio of the genotype BB and BW in the F_2 progeny.

Q.24. A cross was made between pure breeding pea plants one with round and green seeds and the other with wrinkled and yellow seeds.

(i) Write the phenotype of F_1 progeny. Give reason for your answer.

(ii) Write the different types of F_2 progeny obtained along with their ratio when F_1 progeny was selfed.

Q.25. (a) Mendel crossed tall pea plants with dwarf pea plants in his experiment. Write his observations giving reason on the F_1 and F_2 generations.

(b) List any two contrasting characters other than height that Mendel used in his experiments in pea plants.

Q.26. A cross was carried out between a pure bred tall pea plant and a pure bred dwarf pea plant and F_1 progeny was obtained. Later, the F_1 progeny was selfed to obtain F_2 progeny. Answer the following questions:

- (i) What is the phenotype of the F_1 progeny and why?
- (ii) Give the phenotypic ratio of the F_2 progeny.
- (iii) Why is the F_2 progeny different from the F_1 Progeny?

Q.27. A blue colour flower plant denoted by BB is crossbred with a white colour flower plant denoted by ww.

- (i) State the colour of flower we would expect in their F_1 progeny.
- (ii) Write the percentage of plants bearing white flower in F_2 generation when the flowers of F_1 plants were selfed.
- (iii) State the expected ratio of the genotype BB : Bb : ww in the F_2 progeny.

Q.28. (i) Differentiate between dominant and recessive traits.

- (ii) 'Gene control traits'? Explain this statement with an example.

Q.29. The genotype of green-stemmed tomato plants is denoted by GG and that of purple-stemmed tomato plant as gg.

When these two plants are crossed:

- (i) What colour of stem would you expect in their F_1 progeny?
- (ii) Give the percentage of purple-stemmed plant if F_1 plants are self pollinated.
- (iii) In what ratio would you find the green and purple colour in the F_1 progeny?

Q.30. With the help of a cross done with garden pea plants, trace the work done by Mendel with a tall and a short plant to arrive at 3 : 1 ratio in the F_2 generation.

Q.31. In Mendel's monohybrid cross between tall and short pea plants, all offsprings were tall. What does this tell us about the trait? What is the ratio of tall and short plants in the F_2 generation?

Q.32. Explain with the help of a figure that father is responsible for the sex of a child.

Q.33. With the help of suitable examples, explain why certain traits cannot be passed on to the next generation. What are such traits called?

Long Answer Type Questions

Q.1. (a) Why did Mendel choose garden pea for his experiments? Write two reasons.

(b) List two contrasting visible characters of garden pea Mendel used for his experiment.

(c) Explain in brief how Mendel interpreted his results to show that the traits may be dominant or recessive.

Q.2. How do Mendel's experiments show that the

(i) Traits may be dominant or recessive

(ii) Traits are inherited independently?

Q.3. (i) What is meant by traits of an individual?

(ii) Explain inherited trait and acquired trait.

(iii) Define speciation. List the factors which could lead to rise of a new species.

Q.4. (i) Why are two letters (such as TT, Tt, tt) used to denote the character of height?

(ii) If a purple pea plant (PP) is crossed with a white coloured pea plant (pp), will we have white flowered pea plant in the F₁ generation? Why?

(iii) Define dominant and recessive traits.

Q.5. (i) Explain whether traits like eye colour or height is genetically inherited. Do power to lift weights and reading French also belong to the same category?

(ii) How do variations affect the evolution of those organisms that reproduce sexually?

Q.6. (i) Some dinosaurs had feathers but could not fly using these feathers. Why?

(ii) What are inherited and acquired traits?

(iii) What is a sex chromosome?

Topic - 2 (Origin of Life And Evolution)

Very Short Answer Type Questions

Q.1. What is speciation?

Q.2. List any two factors that could lead to speciation?

Q.3. What is the only progressive trend seen in evolution?

Q.4. What is shown in the following figure?

Q.5. How does creation of variations in a species promote survival?

Q.6. Write the contribution of Charles Darwin in the field of evolution.

Q.7. Name the fossil shown in the figure below –

Q.8. How was the vegetable kale obtained from cabbage?

Q.9. What is the main reason for evolution according to Darwin?

Q.10. One of the examples of two analogous organs can be the wing of parrot and

(i) Flipper of whale (ii) Foreleg of horse (iii) Front leg of frog (iv) Wings of housefly.

Q.11. In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzee have a 'better' body design? Why or why not?

Q.12. 70% of individuals in a population of hydra show long tentacles whereas 10% of individuals in the same population show short tentacles. Which trait is likely to have arisen earlier?

Short Answer Type Questions – I

Q.1. Write full forms of DNA. Where is it located?

Q.2. Name any four mechanisms which can lead to speciation in sexually reproducing organisms.

Q.3. Give two instances of species where geographical isolation does not lead to any speciation.

Q.4. What do the following terms mean? (i) Micro – evolution, (ii) Fossils

Q.5. How does natural selection differ from genetic drift?

Q.6. How are areas of study – evolution and classification – interlinked?

Q.7. State two methods of determining the age of fossils.

Q.8. Can a wing of a butterfly and the wing of a bat be considered homologous organs? Why or why not?

Q.9. Will geographical isolation be a major factor in the speciation of an organism that reproduces asexually? Why or why not?

Q.10. Give an example of characteristics being used to determine how close two species are in evolutionary terms.

Q.11. Explain the importance of fossils in deciding evolutionary relationships.

Q.12. In an area A, the leaf material available to beetles was very less. What are the two consequences seen in the beetles?

Short Answer Type Questions – II

Q.1. What is speciation? Explain in brief the role of natural selection and genetic drift in this process.

Q.2. What is speciation? List four factors responsible for speciation.

Q.3. Explain the following: (a) Speciation (b) Natural Selection

Q.4. List three main factors responsible for the speciation and briefly describe each of them.

Q.5. Define the following with one example for each:

(i) Genetic Drift (ii) Natural Selection (iii) Reproductive isolation.

Q.6. Differentiate between homologous and analogous organs. Give one example of each.

Q.7. Name three organisms which are fossilized.

Q.8. Define evolution. Why are traits acquired during life time of an individual not inherited?

Q.9. What are fossils? State their importance in the study of evolution with the help of a suitable example.

OR

What are fossils? What do they tell us about the process of evolution?

Q.10. Which of the following fossils is invertebrate and which one is vertebrate? (a) Dinosaur, (b) Ammonite.

(ii) How can the age of fossil be ascertained? State in brief any two methods.

Q.11. (i) What are fossils? How do we know how old the fossils are?

(ii) State two differences between homologous and analogous organs.

Q.12. Give two uses of fossils. How does the study of fossils provide evidence in favour of organic evolution?

Q.13. When organisms die, their bodies will decompose and be lost. Then how do we get fossils? Give an example.

Q.14. How were farmers able to obtain present day cabbage, cauliflower and broccoli from wild cabbage?

Q.15. "Evolution should not be equated with progress". Why?

Q.16. "Two areas of study namely 'evolution' and 'classification' are interlinked". Justify this statement.

Q.17. List three factors that provide evidences in favour of evolution in organisms and state the role of each in brief.

Q.18. Homologous organs are different from analogous organs.

(i) Mention the two basic characteristics that decide about analogy and homology between the two organs.

(ii) On what basis is the classification of organisms into prokaryotic and eukaryotic done?

Q.19. There are two different types of organs, homologous and analogous. Differentiate between them by giving three points.

Q.20.

(a) Identify the fossils A and B?

(b) What type of fossils are these?

Q.21. All human races like Africans, Asians, Europeans, Americans and others look so different from each other still they belong to the same species. Give three points to justify the statement.

Q.22. Explain with an example for each, how the following provides evidences in favour of evolution in organisms:

(i) Homologous Organs

(ii) Analogous Organs

(iii) Fossils

Q.23. (i) Planaria, insects, octopus and vertebrates all have eyes. Can we group eyes of these animals together to establish a common evolutionary origin? Justify your answer.

(ii) "Birds have evolved from reptiles". State evidence to prove the statement.

Q.24. "It is a matter of chance whether a couple will have a male or a female child." Justify this statement by drawing a flowchart.

Q.25. (a) Cite the evidence on the basis of which it is concluded that birds have evolved from reptiles.

(b) Insects, Octopus, Planaria and Vertebrates also possess eyes. Can these animals be grouped together on the basis of the eyes they possess. Why or why not? Give reason to justify your answer.

Q.26. 'Variations that confer an advantage to an individual organism only will survive in a population.' Justify.

OR

Only variation that confer an advantage to a an individual organism will survive in a population. Do you agree with this statement? Why or why not?

Q.27. The modern human beings have originated in Africa.

(i) Which evidence suggests this fact?

(ii) If an animal is similar to its ancestors, what does this imply?

Q.28. Why are small number of surviving tigers a cause of worry from the point of view of genetics? Explain.

Q.29. (i) A husband has 46 chromosomes, his wife has 46 chromosomes. Then why don't their offsprings have 46 pairs of chromosomes, which is obtained by the fusion of male and female gametes?

(ii) "Geographical isolation is not a major factor in the speciation of a self pollinating plant species." Justify this statement with the help of an example.

Long Answer Type Questions

Q.1. Define evolution. How does it occur? Describe how fossils provide us evidences in support of evolution.

Q.2. What is multiple fission ? How does it occur in an organism? Explain briefly. Name one organism which exhibits this type of reproduction.

Q.3. What is meant by speciation? List four factors that could lead to speciation. Which of these cannot be a major factor in the speciation of a self-pollinating plant species. Give reason to justify your answer.

OR

What is speciation? List four factors that could lead to speciation. Which of these cannot be a major factor in the speciation of a self-pollinating plant species? Explain.

Q.4. What is speciation? What are the factors that lead to speciation? Explain any two factors.

Q.5 (a) How does speciation take place?

(b) Define the term GENE.

(c) The gene for red hair is recessive to the gene for black hair. What will be the hair colour of a child if he inherits a gene for red colour from his mother and a gene for black hair from his father? Express with the help of flow chart.

Q.6. What are fossils? How are they formed? List two methods of determining the age of fossils. Explain in brief the importance of fossils in deciding the evolutionary relationships.

OR

Explain the importance of fossils in deciding evolutionary relationships.

Q.7. What evidence do we have for the origin of life from inanimate matter?

Q.8. A particular species 'X' has more common characteristics with species 'Y', whereas another species 'Z' has less common characteristics with species 'Y'. Which two species are more closely related? Why? On what basis are the eukaryotic organisms further classified? Why is this basis important? What is the importance of homologous organs?