BIOLOGY

BOOKS - S CHAND BIOLOGY (HINGLISH)

HEREDITY AND EVOLUTION

Exercise

1. Which of the processes, sexual reproduction or asexual reproduction, brings about maximum variations in the off springs ?

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2. Name one variation in humans connected with ears.

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3. What constitutes the link between one generation and the next ?

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4. 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?

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5. Mendel said that the characteristics or traits of organisms are carried from one generation to the next by internal factors which occur in pairs. What is the modern name for these factors ?

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6. Some plants occur in one of the two sizes : tall or dwarf. This characteristic is controlled by one pair of genes. Tallness is dominant to dwarfness. Choose suitable letters for this gene pair.

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7. What are the chromosomes XY and XX known as ?

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8. Which of the two, sperm or ovum, decides the sex of the child ?

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9. State whether the following statement is true or false :

The sex of an infant is not a case of inheritance of characteristics.

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10. A new born child has an XY pair of chromosomes. Will it be a baby boy or a baby girl ?

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11. Which of the following combinations of sex chromosomes produce a male child : XX or XY ?

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12. Name the first scientist who studied the inheritance of traits from one generation to the next.

A. Gregor Johann Mendel, Austria

B. G.G Mendel

C. George Mendel

D. Gregor Johansen Mendel

Answer: A

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13. what type of plants were used by Mendel for conducting his experiments on inheritance ?

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14. The gene for red hair is recessive to the gene for black hair. What will be the hair colour of a person if he inherits a gene for red hair from his mother and a gene for black hair from his father ?

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15. What are the four blood groups in humans ?

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16. Name one reptile in each case where higher incubation temperature leads to the development of : (a) male progeny, (b) female progeny.

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17. Fill in the following blanks with suitable words :

(a) Genes always work in ..... .

(b) In pea plants, the gene for dwarfness is ..... Whereas that for tallness is ..... .

(c) Most people have ..... earlobes but some have ..... earlobes .

(d) A human gamete contains ..... chromosomes whereas a normal body cell has ..... chromosomes in it.

(d) All races of man have ..... blood groups .

(f) The ..... chromosomes for a ..... are XX whereas that for a ..... are XY .

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18. Which of the following represent tall plants and which represent short plants (or dwarf plants) ?

A. TT, tt

B. tt, TT

C. Tt, tt

D. both a and c

Answer: D

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19. A man having blood group O marries a woman having blood group B and they have a daughter. What will be the blood group of the daughter ?

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20. (a) Name the scientist who gave the laws of inheritance .

(b) Name an animal in which individuals can change sex. What does this indicate ?

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21. Explain with an example, how genes control the characteristics (or traits).

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22. (a) State one advantage of variation to a species.

(b) What are sex chromosomes ? How many sex chromosomes are there ? Name them.

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23. How is the sex of the child determined in human beings?

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24. What do the following symbols used in the topic on heredity represent ?

(a) TT (b) tt (c) XX (d) XY

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25. (a) What will you get in the F_1 and F_2 generations in the following cross ?

Pure tall pea plant x pure dwarf pea plant

(b) Is it an example of monohybrid cross or dihybrid cross ?

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26. In the F_2 generation of a cross, progeny having different traits are produced in the ratio 3 : 1 . State whether it is a monohybrid cross or a dihybrid cross ? Give one example of such a cross.

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27. (a) what is the genotype of dwarf plants which always produced dwarf offspring ?

(b) What is the genotype of tall plants which always produced tall offspring ?

(c) What is the genotype of (i) dwarf plants , and (ii) tall plants, whose parental cross always produces tall offspring ?

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28. (a) If a normal human cell has 46 chromosomes, how many chromosomes will be there in a human (i) sperm cell, and (ii) zygote ?

(b) What sizes of plants are produced if both parents have genes Tt ?

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29. In a human, how many chromosomes are present in :

(a) a brain cell ?

(b) a sperm in the testes ?

(c) an egg which has just been produced by the ovary ?

(d) a skin cell ?

(e) a fertilised egg ?

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30. Gregor Mendel's first law of genetics states "Of a pair of contrasted characters, only one can be represented in a gamete by its internal 'factor'.

(b) State where these factors are found in gametes.

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31. Does genetic combination of mother play a significant role in determining the of a new born baby ?

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32. Given the pair of contrasting traits of the following characters in pea plants and mention which is dominant and recessive .

(i) yellow seed (ii) round seed.

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33. (a) What is meant by 'heredity' ? What are the units of heredity .

(b) State Mendel's first law of inheritance .

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34. (a) Why did Mendel choose pea plants for conducting his experiments on inheritance ?

(b) State Mendel's second law of inheritance .

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35. (a) What do you understand by the term 'variation' ?

(b) Name two human traits which show variation .

(c) How does the creation of variation in a species ensure its survival ?

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36. (a) What are genes ? Where are they located in our body ?

(b) What is meant by dominant genes and recessive genes ? Give one example of each .

(c) Explain how, characteristics (or traits) are inherited through genes.

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37. (a) How do Mendel's experiments show that traits may be dominant or recessive ?

(b) How do Mendel's experiments show that traits are inherited independently ?

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38. When two parents are crossed , the offspring are referred to as :

A. recessives

B. test cross

C. F_1 generation

D. F_2 generation

Answer: C

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39. 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

Answer: A

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40. For his experiments on heredity, Mendel used :

A. papaya plants

B. potato plants

C. pea plants

D. pear plants

Answer: C

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41. The human animal which has an XY pair of chromosomes is called :

A. male

B. hybrid

C. female

D. doomed

Answer: A

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42. The science of heredity is known as :

A. biology

B. embryology

C. genetics

D. biochemistry

Answer: C

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43. A gene is a :

A. hybrid

B. heritable trait

C. pure breed

D. part of a chromosome that transmits a trait

Answer: D

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44. 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

Answer: B

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45. In order to ensure that he had pure-breeding plants for his experiments, Mendel :

A. cross-fertilised each variety 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.

Answer: B

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46. In the human blood grouping, the four basic blood types are type A, typeB, typeAB, and type O. The blood proteins A and B are :

A. simple dominant and recessive traits

B. incomplete dominant traits

C. codominant traits

D. sex-linked traits

Answer: C

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47. 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

Answer: C

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48. 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^AI^A and I^BI^O

B. I^AI^B and I^BI^O

C. I^AI^O and I^BI^O

D. I^AI^B and I^AI^O

Answer: A

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49. The palisade cells of a species of plants contain 28 chromosomes. How many chromosomes will there be in each gamete produced by the plant ?

A. 56

B. 28

C. 14

D. 4

Answer: C

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50. Which of the following may be used to obtain an F_2 generation ?

A. allowing flowers on a parent plant to be self-pollinated

B. allowing flowers on an F_1 plant to be self-pollinated

C. cross-pollinating an F_1 plant with a parent plant

D. cross-pollinating two parent plants

Answer: B

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51. Thed following results were obtained by a scientist who crossed the F_1 generation of pure-breeding parents for round and wrinkled seeds.

Dominant trait Recissive trait No. of F_2 offspring

Round seeds Wrinkled seeds 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

Answer: D

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52. The visible characteristic in an organism is known as :

A. prototype

B. stereotype

C. phenotype

D. genotype

Answer: C

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53. Exchange of genetic material takes place in

A. vegetative reproduction

B. asexual reproduction

C. sexual reproduction

D. budding

Answer: C

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54. 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 plant is not governed by gene T or t

Answer: A

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55. The number of pair(s) of sex chromosomes in the zygote of humans is

A. one

B. two

C. three

D. four

Answer: A

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56. 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_2 is

A. $1:3$

B. $3:1$

C. $1:1$

D. $2:1$

Answer: C

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57. 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

Answer: A

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58. 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)

Answer: B

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59. 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

Answer: A

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60. 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 DNA .

Answer: C

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61. 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)

Answer: C

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62. 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 an ovum

D. the presence of a Y chromosome in a sperm

Answer: D

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63. 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

Answer: B

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64. 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

Answer: D

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65. 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

Answer: C

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66. In humans, if gene B gives brown eyes and gene b gives blue eyes. What will be the colour of eyes of the persons having the following combination of genes ?

(a) Bb (b) bb (c) BB

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67. Pure-bred pea plants A are crossed with pure-bred pea plants B. It is found that the plants which look like A do not appear in F_1 generation

but re-emerge in F_2 generation. Which of the plants A and B are : (i) tall, and (ii) dwarf ? Give reason for your answer .

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68. Pure-breed tall pea plants are first crossed with pure-bred dwarf pea plants. The pea plants obtained in F_1 generation are then cross-bred to produce F_2 generation of pea plants.

(i) What do the plants of F_1 generation look like ?

(b) What is the ratio of all plants to dwarf plants in F_2 generation ?

(c) Which type of plants were missing in F_1 generation but reappeared in F_2 generation ?

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69. A plant has two varieties, one with red petals and the other with white petals. When these two varieties are cross-pollinated, all the offsprings have red petals ?

(a) Which gene is dominant ?

(b) Choose suitable letters to represent the two genes.

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70. A red-haired woman marries a brown-haired man, and all the children are brown haired. Explain this genetically.

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71. A black mouse mates with a brown mouse, and all the offsprings are back.

(a) Why are no brown offsprings produced ?

(b) If two of the black offpsrings mate with each other what kind of offspring would you expect and in what proportions ? Give reason for your answer.

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72. (a) E is the gene for brown eye colour and e is the gene for blue eye colour. Which gene is (i) recessive, and (ii) dominant ?

(b) Both father and mother have the genes Ee in their cells. What colour are their eyes ?

(c) Which combination of genes in the zygote will produce children with blue eyes ?

(d) Which combinations of genes in the zygote will produce children with brown eyes ?

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73. What are the possible blood groups likely to be inherited by children born to a group A mother and a group B father ? Explain your reasoning.

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74. A couple with a newborn baby is troubled that the child does not resemble either of them. Suspecting that a mixup occurred at the

hospital, they check the blood type of the infant. It is type O. Because the father is type A and the mother type B, they conclude that a mixup has definitely occurred. Are they correct ? Give reason for your answer.

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75. A man with blood group A marries 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?

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76. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as

A. TTWW

B. TTww

C. TtWW

D. TtWw

Answer: C

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77. A person first crossed pure-bred pea plants having round-yellow seeds with pure-bred pea plants having wrinkled-green seeds and found that only A-B type of seeds were produced in the F_1 generation. When F_1 generation pea plants having A-B type of seeds were cross-bred by self-pollination, then in addition to the original round-yellow and wrinkled-green seeds, two new varieties A-D and C-B type of seeds were also obtained.

(a) What are A-B type of seeds ?

(b) State whether A and B are dominant traits or recessive traits.

(c) What are A-D type of seeds ?

(d) What are C-B type of seeds ?

(e) Out of A-B and A-D types of seeds, which one will be produced in (i) minimum numbers, and (ii) maximum numbers, in the F_2 generation ?

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78. The person A has only B chromosomes in all its gametes. On the other hand, another person C has chromosome D in half of gametes and chromosome E in the other half of gametes. When chromosomes B and D combine during fertilisation, a female zygote results. On the other hand, combination of B and E chromosomes produces a male zygote.

(a) What are chromosomes (i) B (ii) D, and (iii) E ?

(b) Out of B, D and E, which two chromosomes are of the same type ?

(c) Which chromosome is smaller in size ?

(d) What is the general name of chromosomes such as B and E ?

(e) Out of the two persons A and C, which one is (i) male, and (ii) female ?

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79. Pure-breed round-yellow pea seeds have genotype RRYY and the pure-bred wrinkled-green pea seeds have genotype rryy. Keeping this in mind, write the phenotypes of the following genotypes of hybrid pea seeds :

(a) Rryy (b) rrYy (c) rrYY (d) RrYy (e) RRyy

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80. What name is given to the sequence of gradual changes over millions of years in which new species are produced ?

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81. Name the scientist who gave the theory of evolution.

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82. State whether the following statement is true or false :

Human beings have evolved from chimpanzees.

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83. State one characteristic which shows that the birds are very closely related to dinosaurs.

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84. Name the ancestor of the following :

Broccoli, Kohlrabi, Kale

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85. Where did life originate on the earth ?

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86. Write the names of at least three inorganic molecules which helped in the origin of life on the earth.

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87. Name the famous book written by Charles Robert Darwin.

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88. The forelimbs of a frog, a bird and a man show the same basic design (or basic structure) of bones. What name is given to such organs ?

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89. Name two organisms which are now extinct and studied from their fossils.

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90. Out of the wing of a bird, wing of an insect and the wing of a bat :

(a) which two are homologous organs ?

(b) which two are analogous organs ?

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91. Why are human beings who look so different from each other in terms of size, colour and looks said to belong to the same species?

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92. Name five varieties of vegetables which have been produced from 'wild cabbage' by the process of artificial selection.

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93. Choose the one term from the following which includes the other three :

broccoli, wild cabbage, cauliflower, cabbage

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94. Fill in the following blanks with suitable words :

(a) The human forelimb and bat's forelimb are an example of ..... Organs whereas an insect's wing and a bat's wing are an example of .....organs.

(b) The evolution of eye is an example of evolution by .....

(c) The scientific name of all human beings is .....

(d) Broccoli has evolved from..... by the process of artificial selection.

(e) The theory of natural selection for evolution was proposed by .....

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95. Match the terms given in column I with those given in column II :

	Column I		Column II
(i)	Fossil	(a)	A famous evolutionist
(ii)	A theory of evolution	(b)	Survival of the fittest
(iii)	Probable ancestor of birds	(c)	Petrified remains of prehistoric
(iv)	Charles Darwin	(d)	Father of genetics
(v)	Gregor Mendel	(e)	Archaeopteryx

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96. EXPLAIN ACQUIRED AND INHERITED TRAITS?

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97. Why are traits acquired during the life-time of an individual not inherited?

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

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99. Name two animals having homologous organs and two having analogous organs. Name these organs.

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

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

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102. In what way are homologous organs evidence for evolution ?

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103. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

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

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105. Name the various tools of tracing evolutionary relationships which have been used for studying human evolution.

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106. Out of bacteria, spider, fish and chimpanzee, which organism has a better body design in evolutionary terms ? Give reason for your answer.

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107. With the help of an example, explain how variation leads to evolution.

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108. (a) What is meant by a species ? Give two examples of plant species and two of animals.

(b) State the various factors which could lead to the formation of new species.

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

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110. Does geographical isolation of individuals of a species lead to the formation of a new species ? Provide a suitable explanation for your answer.

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111. Bacteria have a simpler body plan when compared with human beings. Does it mean that human beings are more evolved than bacteria ? Explain your answer.

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112. In evolutionary terms, we have more in common with

A. a chinese school boy

B. a chimpanzee

C. a spider

D. a bacterium

Answer: B

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113. The human species has genetic roots in :

A. America

B. Africa

C. Australia

D. Antarctica

Answer: B

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114. Which of the following gas was not present in early earth atmosphere ?

A. Ammonia

B. Oxygen

C. Hydrogen sulphide

D. Methane

Answer: B

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115. A gradual change, over a long period, in a form of life is known as :

A. erosion

B. evolution

C. revolution

D. evaluation

Answer: B

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116. Scientists believe that all life originated in :

A. the sea

B. the soil

C. the ground

D. the air

Answer: A

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117. According to scientists, aves have evolved from :

A. mammals

B. amphibians

C. reptiles

D. arthropods

Answer: C

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118. The theory of evolution of species by natural selection was given by

A. Mendel

B. Darwin

C. Dalton

D. Lamarck

Answer: B

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119. The term 'father of genetics' is used for the scientist :

A. Morgan

B. Mendel

C. Darwin

D. Marie Curie

Answer: B

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120. 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

Answer: C

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121. Only one of the following characteristic of the parents can be inherited by their childern. This one is :

A. deep scar on chin

B. snub nose

C. technique of swimming

D. cut nose

Answer: B

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122. The organs which perform different functions but have the same basic structure are known as :

A. homologous organs

B. analogous organs

C. homolytic organs

D. analytic organs

Answer: A

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123. 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

Answer: B

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124. Wing of an insect and forelimb of a bird are :

A. analogous organs

B. analeptic organs

C. homologous organs

D. homophobic organs

Answer: A

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125. 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.

Answer: B

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126. 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

Answer: A

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127. 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

Answer: C

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128. 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 evolutionary connection between reptiles and 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

Answer: D

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129. 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.

Answer: B

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130. 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)

Answer: A

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131. 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

Answer: C

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132. 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

Answer: D

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133. One of the following has not been produced from wild cabbage by the process of artificial selection. This one is :

A. kohlrabi

B. cabbage

C. spinach

D. kale

Answer: C

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134. The fossil trilobite was originally :

A. an arthropod

B. an invertebrate

C. a reptile

D. an ave

Answer: A

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135. One pair of organs in the following animals are not homologous. This is :

A. forelimbs in humans and lizard

B. forelimbs in lizard and frog

C. wings in butterfly and bat

D. wings in bat and bird

Answer: C

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136. The wings of a housefly and the wings of a sparrow are an example of :

A. analogous organs

B. vestigial organs

C. respiratory organs

D. homologous organs

Answer: A

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137. The farmers have been cultivating a food plant X for over two thousand years and have produced as many as five entirely different looking vegetables A, B, C, D and E from it.

(a) What could the plant X be ?

(b) What are A, B, C, D and E

(c) What is the process of evolution involved in this example known as ?

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138. 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?

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147. What factors could lead to the rise of a new species?

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

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

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

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

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

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153. Why are human beings who look so different from each other in terms of size, colour and looks said to belong to the same species?

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

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155. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as

A. TTWW

B. TTww

C. TtWW

D. TtWw

Answer: C

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156. An example of homologous organs is

A. Our arm and a dog's foreleg

B. Our teeth and an elephants tusks

C. potato and runners of grass

D. all of the apove

Answer: D

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157. In evolutionary terms, we have more in common with

A. a Chinese school boy

B. a chimpanzee

C. a spider

D. a bacterium

Answer: A

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158. A study found that children with light-coloured eyes are likely to have parents with light-coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?

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159. How are the areas of study – evolution and classification – interlinked?

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160. Explain the terms analogous and homologous organs with examples.

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161. Outline a project which aims to find the dominant coat colour in dogs.

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162. Explain the importance of fossils in deciding evolutionary relationships.

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

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164. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?

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165. How is the equal genetic contribution of male and female parents ensured in the progeny?

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

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Questions Based On High Order Thinking Skills Hots

1. Mendel first crossed pure-bred pea plants having round-yellow seeds with pure-bred pea plants having wrinkled-green seeds and found that only round-yellow seeds were cross-bred by self pollination, then peas having round-yellow seeds, round green seeds, wrinkled-yellow seeds and wrinkled-green seeds were produced. Mendel collected a total of 2160 seeds.

(a) What will be the number of (i) round green seeds (ii) wrinkled green seeds (iii) round yellow seeds, and (iv) wrinkled-yellow seeds ?

(b) Which 'ratio' as established by Mendel have you made use of in answering the part (a) above ?

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2. Some of the important fossils which have been studied are those of organisms X, Y and Z. X were marine arthropods which were common between 400 to 600 million years ago. Y were the invertebrate animals

(molluscs) with a flat, coiled, spiral shell which lived in the sea about 180 million years ago. Z are the extinct carnivorous or herbivorous reptiles which appeared on the earth about 250 million years ago and became extinct about 65 million years ago. What are X, Y and Z ?

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3. There are five animals A, B, C, D and E. The animal A uses its modified forelimbs for flying. The animal B uses its forelimbs for running whereas the animal C uses its forelimbs for grasping. The animal D can live on land as well as in water and uses its forelimbs to prop up the front end of its body when at rest. The animal E which respires by using spiracles and tracheae uses wings for flying but its wings are analogous to the modified forelimbs of animal A.

(a) What could the animals A, B, C, D and E be ?

(b) Why are the forelimbs of animals A, B, C and D called homologous organs ?

(c) What does the existence of homologous organs in animals A, B, C and D tell us about their ancestors ?

(d) Why are the modified forelimbs of animal A and the wings of animal E called analogous organs ?

(e) State whether animals A and E have a common ancestor or not .

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4. X, Y, and Z are three animals. The animal X can fly but animal Y can only run on ground or walls. The forelimbs of animals X and Y have the same basic design but they are used for different purposes such as flying and running respectively. The animal Z became extinct a long time ago. The study of fossils of Z tells us that it had some features like those of X and some like those of Y. In fact, Z is said to form a connecting link in the evolutionary chain of X and Y.

(a) What could the animals X, Y and Z be?

(b) What name is given to the forelimbs like those of X and Y which have the same basic design but different functions ?

(c) Name one feature in which Z resembled X.

(d) Name one feature in which Z resembled Y.

(e) Which is the correct evolutionary chain involving X, Y and Z : $X \rightarrow Z \rightarrow Y$ or $Y \rightarrow Z \rightarrow X$?

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5. A population of red beetles lives in green bushes in a garden. Once during the process of breeding, a green beetle is produced.

(a) State whether the change in colour of beetle is a process of evolution or not.

(b) Can the new colour of green beetle be passed on to its next generations ?

(c) What will be the advantage (if any) of the green colour to the beetle ?

(d) State whether the production of green colour involved a change in genetic material or not.

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6. The organs P and Q of two animals have different structures but similar functions. On the other hand, the two organs R and S of two other

animals have the same basic structure but different functions.

(a) What are the organs like P and Q known as ?

(b) Name the organs like P and Q. Also name the animals which have such organs.

(c) What are the organs like R and S called ?

(d) Name the organs like R and S. Also name the animals which have such organs.

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Very Short Answer Type Questions

1. Name an animal having rudimentary eyes.

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Long Answer Type Questions

1. (a) Name the scientist who gave the theory of origin of life on earth. What is this theory ?

(b) How are those species which are now 'extinct' studied ?

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2. What do you understand by the term 'evolution' ? State Darwin's theory of evolution.

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3. (a) Explain the terms 'analogous organs' and 'homologous organs' with examples.

(b) In what way are analogous organs evidence for evolution ?

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4. (a) Define 'speciation'. Explain how speciation occurs.

(b) Will geographical isolation be a major factor in the speciation of a self-pollinating plant species ? Give reason for your answer.

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5. (a) Define 'natural selection'.

(b) "Only variations that confer an advantage to an individual organism will survive in a population". Do you agree with this statement ? Give reason for your answer.

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Multiple Choice Question

1. 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.

Answer: B

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