# UNIQUE SCHOOL OF STUDIES

## SEKHA ROAD SMALSAR

# WORKSHEET

## Class 10 - Science

**Time Allowed: 3 hours** **Maximum Marks: 80**

1. Who was the first scientist to isolate DNA?

   a) Watson and crick
   b) Weismann mishear
   c) Friedrich
   d) Darwin

2. A cross between two tall pea plants resulted in offsprings having a few dwarf plants. The gene-combination of the parental plants must be

   a) Tt and Tt
   b) Tt and tt
   c) TT and tt
   d) TT and Tt

3. A trait in an organism is influenced by

   a) Neither maternal nor paternal DNA.
   b) Both maternal & Paternal DNA
   c) Paternal DNA only
   d) Maternal DNA only

4. It a round green seeded pea plant (RRYY) is crossed with wrinkled yellow seeded pea plant (rr yy) the seeds to be produced in $F_1$ generation will be:

   a) Wrinkled and yellow
   b) wrinkled and green
   c) round and yellow
   d) round and green

5. Alternative forms of a gene are called

   a) Multiples
   b) Chromosomes
   c) Loci
   d) Alleles

6. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because

   a) height of pea plant is not governed by gene ‘T’ or ‘t’
   b) tallness is the dominant trait
   c) tallness is the recessive trait
   d) shortness is the dominant trait

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

   a) one
   b) three
   c) four
   d) two

8. Select the group which shares maximum number of common characters-

   a) two individuals of a species
   b) two genera of a family
   c) two species of a genus
   d) two genera of two families

9. The branch of biology-related with heredity and variation is called

a) Genetics
b) Livinglogy
c) Taxonomy
d) Evolution

10. Father of Human genetics is

a) H.G Khurana
b) Charles Darwin
c) Sir Archibald Garrod
d) Gregor Mendel

11. A cross between pea plant with white flowers (vv) and pea plant with violet flowers (VV) resulted in $F_2$ progeny in which ratio of violet (VV) and white (vv) flowers will be:

a) 3 : 1
b) 1 : 1
c) 2 : 1
d) 1 : 3

12. Select the correct statement among the following.

i. Human female possesses homomorphic sex chromosomes.
ii. Males possess homogametic sex chromosomes in humans.
iii. Human females possess heterogametic sex chromosomes.
iv. Human male possesses homomorphic sex chromosomes.

a) Statement (iv) is correct.
b) Statement (i) is correct.
c) Statement (ii) is correct.
d) Statement (iii) is correct.

13. The genetic constitution of an organism is called

a) Phenotype
b) Genome
c) Trait
d) Genotype

14. 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) and (iv)
c) (iii) only
d) (ii) and (iv)

15. A cross made between two pea plants produces 50% tall and 50% short pea plants. The gene combination of the parental pea plants must be

a) Tt and Tt
b) TT and Tt
c) Tt and tt
d) TT and tt

16. In an experiment with pea plants, a pure tall plant (TT) is crossed with a pure short plant (tt). The ratio of pure tall plant to pure short plants in $F_2$ generation will be

a) 1 : 3
b) 3 : 1
c) 2 : 1
d) 1 : 1

17. A cross between hybrid and a parent is known as

a) Back cross
b) Test cross

c) Monohybrid cross
d) Reciprocal cross

18. In a cross between pure tall pea plants (TT) and pure dwarf pea plants (tt) the offsprings of $F_1$ generation were all tall. When $F_1$ generation was self-crossed, the gene combinations of the offsprings of $F_2$ generation will be:

a) Tt : tt
b) TT : tt
c) TT : Tt : tt
d) TT : Tt

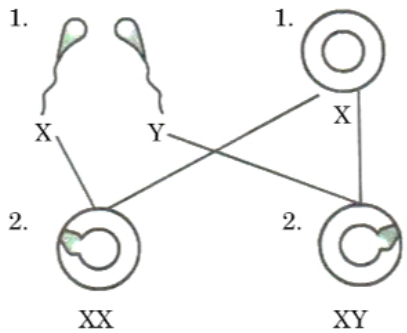
19. If a round, green seeded pea plant (RRyy) is crossed with wrinkled, yellow seeded pea plant (rrYY) the seeds to be produced is F, generation will be:

a) Wrinkled and green
b) Round and green
c) Round and yellow
d) Wrinkled and yellow

20. Which of the following organism has only one type of sex chromosome called X-chromosome?

a) Ant
b) Lizard
c) Cricket
d) Bee

21. How do the variations in a species promote survival?
22. List any two pairs of visible contrasting characters of garden pea plants used by Mendel for his experiments stating the dominant and recessive characters in each pair.
23. What is $F_2$ -generation?
24. Mendel crossed a round and yellow seeded pea plant with a wrinkled and green seeded pea plant. What did the plants of $F_1$ generation look like in terms of shape and colour of seed? On self-pollinating $F_1$ generation plants, plants with four types of combinations of characters were seen in $F_2$ generation. Write the combinations along with their ratios.
25. How many pairs of chromosomes are present in human beings? Out of this how many are sex chromosomes? How many types of sex chromosomes are found in human beings?
26. In human beings, the probability of getting a male or a female child is 50%. Explain with the help of a flow diagram only.
27. Why is the progeny always tall when a tall pea plant is crossed with a short pea plant?
28. Define a gene (give any one definition).
29. Explain how the original number of chromosomes present in the parents are restored in the progeny. Name the cell division by which chromosome number is maintained in the progeny.
30. Write the genotype of man with blood group 'A'.
31. How do Mendel's experiments show that traits may be dominant or recessive?
32. a. Label (1) and (2) in the given diagram showing sex determination in human beings.
    b. If a child inherits X-chromosome from the father what will be his/her gender?



33. Give one example each of characters that are inherited and the ones that are acquired in humans. Mention the differences between the inherited and acquired characters.
34. Why offsprings differ from parents in certain characters?
35. The human beings who look so different from each other in terms of colour, size and looks are said to belong to the same species. Why? Justify your answer.
36. A plant with violet flowers (VV) was crossed with a plant with white flowers (vv).
    a. What colour of flowers was obtained in the plants of $F_1$ generation and why?
    b. Write the percentage of plants with white flowers in $F_2$ generation plants, if $F_1$ plants were self-pollinated. Give reason why this trait was not expressed in $F_1$ generation.
    c. In what ratio did we get the plants with (VV) and (Vv) gene combination in the $F_2$ generation?
37. 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 of black hair from his father? Express with the help of flowchart.
38. Does genetic combination of mothers play a significant role in determining the sex of a newborn?
39. Why do all the gametes formed in human females have X chromosome?
40. Why is Mendel known as father of genetics?
41. i. Who provided the evidence of DNA as genetic material?
    ii. Why DNA is called polynucleotide?
    iii. List three important features of double helical model of DNA.
42. 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?
43. Give the respective scientific terms used for studying
    i. The mechanism by which variations are created and inherited.
    ii. the development of new types of organisms from the existing ones.
44. A man with type A blood has a wife with type B. They have a child with type O blood. Give the genotype of all the three. What other blood groups can be expected in the future offspring of this couple?
45. A green stemmed tomato plant denoted by (GG) is crossed with a tomato plant with purple stem denoted by (gg).
    a. What colour of the stem would you expect in their $F_1$ progeny?
    b. In what ratio would you find the green and purple coloured stem in plants of $F_2$ progeny?
    c. What conclusion can be drawn for the above observations?
46. How is the sex of the child determined in human beings?
47. **Read the following text carefully and answer the questions that follow:**

    Mendel blended his knowledge of Science and mathe matics to keep the count of the individuals exhibiting a particular trait in each generation. He observed a number of contrasting visible characters controlled in pea plants in a field. He conducted many experiments to arrive at the laws of inheritance.

    i. What are recessive traits? (1)
    ii. What do the F1 progeny of tall plants with round seeds and short plants with wrinkled seeds look like? (1)
    iii. Mention the type of the new combinations of plants obtained in F2 progeny along with their ratio, if F1 progeny was allowed to self pollinate. (2)

    **OR**

    If 1600 plants were obtained in F2 progeny, write the number of plants having traits:

a. Tall with round seeds

b. Short with wrinkled seeds

Write the conclusion of the above experiment. (2)

48. **Read the following text carefully and answer the questions that follow:**

Sex of an individual is determined by different factors in various species. Some animals rely entirely on the environmental cues, while in some other animal's the individuals can change their sex during their life time indicating that sex of some species is not genetically determined. However, in human beings, the sex of an individual is largely determined genetically.

i. Write the number of chromosomes present in human beings apart from sex chromosomes. Which of the parent has a mismatched pair of sex chromosomes? (1)

ii. In what way are the sex chromosomes **X** and **Y** different in size? Name the mismatched pair of sex chromosome in humans. (1)

iii. Citing two examples, justify the statement **Sex of an individual is not always determined genetically**. (2)

**OR**

Draw a flow chart to show that sex is determined genetically in human beings. (2)

49. **Assertion (A):** If mother is homozygous for black hair and father has red hair then their child can inherit black hair.
**Reason (R):** Gene for black hair is recessive to gene for red hair in humans.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

50. **Assertion (A):** If mother has two dominant alleles for black hair and father has two recessive alleles for blonde hair then their child will inherit one dominant allele from mother and one recessive allele from father and will have black hair.
**Reason (R):** Progeny inherits one genes for each trait from its parents but the trait shown by progeny depends on inherited alleles.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.