Accumulation of Variation During Reproduction

1. **Where is DNA found in a cell?**
2. **Why is DNA copying necessary during reproduction**
3. **What is heredity?**
4. **What is gene?**
5. **Name the information source for making proteins in the cells**
6. **"No two individuals are absolutely alike in a population." Why?**
7. **What are chromosomes? Explain how sexually reproducing organisms the number of chromosomes in the progeny is maintained.**
8. **What is DNA copying? State its importance.**
9. **"DNA copies generated during reproduction will be similar but may not be identical to the original." Justify the statement.**
10. **What is the effect of DNA copying, which is not perfectly accurate, on the reproduction process? How does the amount of DNA remain constant though each new generation is a combination of DNA copies of two individuals?**
11. **"The chromosomal number of the sexually reproducing parents and their offspring is the same." Justify this**
12. **State the importance of chromosomal difference between sperms and eggs of humans.**
13. **How do organisms, whether reproduced asexually or sexually maintain a constant chromosome number through several generations? Explain with the help of suitable example.**

Mendel's Law inheritance

1. **Explain Mendel's view of a dominant trait. Give an example. [2011 D, 2020 JBB/1**
2. **In an asexually reproducing species, if a trait X exists in 5% of a population and trait Y exists in 70% of the same population, which of the two trait is likely to have arisen earlier ? Give reason.**
3. **(a) What will be the consequence when a small population of individuals is separated due to a large barrier in between them?**
4. **(b) DNA has a property that it is used as a tool in genetic engineering. Mention the property.**
5. **Mention the information source of making proteins in the cell. What is the basic event in reproduction**
6. **Explain with the help of example where the colour change gives no survival advantage to a species**
7. **How can we say that change in genes can be brought about by change in DNA**
8. **"A trait may be inherited , but may not be expressed " Justify this statement with the help of suitable examples.**
9. **Name the plant Mendel used for his experiment. What type of progeny was obtained by Mendel in F1 and F2 generations when he crossed the tall and short plants? Write the ratio he obtained in F2 generation plants.**
10. **State Mendel's two Laws of inheritance**

11. If we cross pure-bred tall (dominant) pea plant with pure-bred dwarf (recessive) pea plant we will get pea plants of F1 generation. If we now self-cross the pea plant of F1 generation, then we obtain pea plants of F2 generation.
    (a) What do the plants of F1 generation look like?
    (b) State the ratio of tall plants to dwarf plants in F2 generation.
    (c) State the type of plants not found in F1 generation but appeared in F2 generation, mentioning the reason for the same.
12. A blue colour flower plant denoted by BB is crossbred with that of white colour flower plant denoted by bb.
    (a) State the colour of flower you would expect in their F1 generation plants.
    (b) What must be the percentage of white flower plants in F2 generation if flowers of F1 plants are self-pollinated?
    (c) State the expected ratio of the genotypes BB and Bb in the F2 progeny.[2012 D, 2013 OD,
13. Why did Mendel choose pea plant for studying inheritance?
14. A cross was made between pure breeding pea plants, one with round and green seeds and the other with wrinkled and yellow seeds.
    a) Write the phenotype of F1 progeny. Give reason for your answer.
    (b) Write the different types of F2 progeny obtained along with their ratio when F1 progeny was selfed.
15. A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other.
    (a) List your observations regarding
    (b) Colour of stem in their F1 progeny.
    (c) Percentage of brown stemmed plants in F2 progeny if F1 plants are self pollinated.
    (d) Ratio of GG and Gg in the progeny. F2 [2020 JBB/3
    (e) Based on the findings of this cross, what conclusion can be drawn
16. Mendel in one of his experiments with pea plants crossed a variety having round seeds with one having wrinkled seeds. Write his observations, giving reasons, of F1 and F2 progeny.
    a) List any two contrasting characters other than roundness of pea plants that Mendel used in his experiments with pea plants.
17. 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
18. List two visible traits of garden pea that Mendal considered in his experiments. How do Mendel's experiments show that the
    (a)traits may be dominant or recessive,
    a) F_2 progeny is different from F_1 progeny.
    b) traits are inherited independently? [2015, 2016 OD
    Or, 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.
19. Answer the following questions:
    (a) What is the phenotype of the F_1 progeny and why?
    (b) Give the phenotypic ratio of the F_2 progeny.
    (c) Why is the F_2 progeny different from the F_1 progeny?(2013

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

(a) What happens to the traits of the dwar plants in this case?

(b) 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.

21. (i) When Mendel crossed pea plants with pure tall and pure short characteristics to produce F_1 progeny, which two observations were made by him in F_1 plants? 1

(ii) Write one difference between dominant and recessive trait.

(iii) (a) In a cross with two pairs of contrasting characters. 2

RRYY (Round Yellow) X rryy (Wrinkled Green) Mendel observed 4 types of combinations in F_2 generation. By which method did he obtain F_2 generation? Write the ratio of the parental combinations obtained and what conclusions were drawn from this experiment.

(b) Justify the statement: "It is possible that a trait is inherited but may not be expressed."

22. Two pea plants - one with round yellow seeds (RRYY) and another with wrinkled green (rryy) seeds produce F1 progeny that have round, yellow (RrYy) seeds.

23. When F1 plants are self-pollinated, which new combination of characters is expected in F2 progeny? How many seeds with these new combinations of characters will be produced when a total 160 seeds are produced in F2 generation ? Explain with reason.

24. In fruit flies the sex chromosomes in males are XY and in females are XX.

(i) Does a male fly inherit X chromosome from his mother or father ?

(ii) How many types of gametes can a female fly produce ?

(iii) How many types of gametes can a male fly produce

25. Study the given data and answer the question that follow

1	2	3
Parent plant cross fertilized and seeds collected.	**F1 generation offsprings**	**F2 generation offspring after self pollination of F1 hybrid**
Male parent – Round Green seeds Female parent Wrinkled Yellow seeds	**All seeds- Round Yellow**	**315- Round yellow 108- Round green 101- Wrinkled yellow 32- Wrinkled green**

(a) What is the term given to this type of cross ?

(b) What does the data in column 2 indicate ?

State how you arrived at this conclusion.

26. The gene for blue eyes (b) is recessive to gene for brown eyes (B). The given figure shows both brown and blue eyes.

BB bb
Bb ?
Bb Bb bb

(a) Write the symbol of the mother (genotype).

(b) What is the genotype of grandmother and grandfather ?

(c) What is the percentage of individuals with brown and blue eyes respectively?

27. In a monohybrid cross between tall pea plants denoted by TT and short pea plants denoted by tt, Preeti obtained only tall plants denoted by Tt in the F1 generation. However, in F2 generation she obtained both tall and short plants. Using the above information explain the law of dominance.

28. (a) Green and red colour of seeds are recessive and dominant traits respectively. Out of F1 and F2, in which generation will the green seed appear, if both parents are not hybrid. Explain giving reason.
(b) Dead remains of two species A and B were buried. Later only A's body was found to be a fossil but not B's. Give reason to explain it.
(c) Species A shares ten characteristics with B species, species C shares fifteen characteristics with D. Which of the two pairs share closer relation?
(d) After the death of two insects, one of the insects was buried in hot mud and the other in usually found mud. Which of the two is more likely to be preserved better and why?

29. (a) Define the gene of a particular protein.
(b) 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? Form the flow chart of this cross.

30. Mendel crossed a pea plant having inflated green pod with a constricted yellow pod.
(a) What type of a cross is it?
(b) What type of plants are obtained in F1 ?
(c) In F2 generation the phenotype ratio is 9:3:3: 1. State the rule for the inheritance of traits observed by Mendel.

SEX DETERMIINATION

1. **"The parents and off-springs of organisms reproducing sexually have the same number of chromosomes." Why?**
2. **"The father is responsible for the sex of a child, not the mother." Justify this statement.**
3. **"The sex of a newborn child is a matter of chance and none of the parents may be considered responsible for it." Justify this statement with the help of a flow chart showing determination of sex of a newborn.**
4. **Explain how equal genetic contribution of male and female parents is ensured in the progeny**
5. **"The sex of a newborn child is a matter of chance and none of the parents may be considered responsible for it".**
6. **With the help of a flow diagram, how would you establish that in human beings the sex of a newborn is purely a matter of chance and none of the parents may be considered responsible for a particular sex of a newborn child.**
7. **How many pairs of chromosomes are present in human beings? Out of these how many are sex chromosomes? How many types of sex chromosomes are found in human beings?**