SHIKSHA CLASSES

Sub. : Science **Answer Paper** **Marks : 30**

Std. : Xth - CBSE **9. Heredity**

SECTION (A) **(Each 1 mark)**

Q.1 : What will be the number of chromosomes present in each gamete produced by the plants if the palisade cells of a species of plant contain 28 chromosomes in all?

Ans : c) 14

OR

A cross between a tall plant (TT) and short plant (tt) resulted in progeny that were all tall plants as :

Ans : a) Tallness is the dominant trait.

Q.2 : In peas , what is the ratio of pure tall plants to pure short plants in F2 generation if a pure tall plant is (TT) and short plant is (tt) ?

Ans : 1 : 1

OR

What is monohybrid cross?

Ans : The cross which occurs between the plants showing two alternate forms of a trait (character).

Q.3 : Assertion (A) : Mendel choose pea plants for his experiment.
Reason (R) : Pea plants were the only plants he could gather for his experiment

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

Q.4: .4: Assertion(A) : According to Darwin, all organisms compete with each other for existence.

Reason (R) : During the struggle for existence there is survival of the fittest.

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

Q.5: Assertion(A) : Traits like tallness and dwarfness in pea plant are inherited independently.

Reason(R): When a homozygous tall pea plant is crossed with dwarf pea plant, medium sized pea plant is obtained in F, generation

Ans : c) A is true but R is false.

Q..6: What is heredity?

Ans : The process by which the features of an organism are passed on from one generation to another is called heredity

OR

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.

Ans : i) The mechanism by which variations are created and inherited – **Genetics**

ii) The development of new type of organisms from the existing ones- **Evolution**

Q.7 : Read the following paragraph answer any two questions from (i) to (iii) (2)

Seema crossed pure breed ---------- were also obtained.

i) What are the A-B type of seeds?

Ans : a) Round -yellow

ii) A-D are _____ and C-B are _____ type of seeds.

Ans : a) Round green and wrinkled yellow respectively

iii) Which one of these will be produced in maximum number in the F2 generation?

Ans : b) A-B

Q.8: If a round, green seeded pea-plant (RRyy) is crossed with a wrinkled yellow seeded pea-plant (rrYY), the seeds produced in F1 generation are

Ans : b) round and yellow

Q.9: Pure-bred pea plant A is crossed with pure¬bred pea plant B. It is found that the plants which look like A do not appear in Fj gene¬ration but re-emerge in F2 generation. Which of the plants A and B are tall and dwarf?

Ans : d) A are dwarf and B are tall

Q.10: 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

Ans : b) Dihybrid cross

Q.11: Which of the following characters can be acquired but not inherited?

Ans : (b) Size of body

Q.12: The ——— is the basic unit of heredity.

Ans : c) Gene

Q.13: The external characters of living organisms called ————.

Ans : a) Phenotype

Q.14: An ———— can be defined as the characteristics which are not under genetic control.

Ans : a) acquired traits

SECTION (B) **(Each 2 marks)**

Q.15: Among all the chromosomes, what is different about a sex chromosome?

Ans : The 22 pair of chromosomes except for the pair of sex chromosomes are known as autosomal chromosomes or autosomes. They are passed on to the progeny and determine various characters such as height, eye colour, complexion, bone structure etc where as the sex chromosomes help to determine the sex of the baby. In humans, the XX chromosome codes for a baby girl where as the XY chromosome codes for a baby boy. All other chromosomes are identical in a human but sex chromosomes are different from one another.

Q.16: 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.

Ans : Human beings are said to belong to the same species because of the following reasons:

1) DNA studies.

2) Number of chromosome is same,

3) All have a common ancestor.

4) They interbreed among themselves to produce fertile young ones of their own kind.

OR

Distinguish between acquired and inherited traits.

Ans :

Acquired Traits	Inherited Traits
1. Development. The traits develop during life time of an individual.	1. The traits are obtained from the parents.
2. Nature. They are somatic variations.	2. They are genetic variations.
3. Cause. Acquired traits develop due to direct effect of environment, use and disuse and conscious efforts.	3. The traits develop due to mutations and reshuffling of genetic material.
4. Fate. They die with the death of the individual.	4. They are passed on to the next generation.

SECTION (C) **(Each 3 marks)**

Q.17 Study the given data and answer the questions following the data:

Parental plants cross ---------- white flowers.

i. What is the term for this type of cross?

ii. What does the data of the column marked F indicate?

iii. Express the gene type of the (a) parents (b) F_1 progeny and (c) F_2 progeny

Ans : i. Monohybrid cross

ii. Red colour of flower dominant over white flower

iii. a) Parents - (RR) and (rr)

b) F_1 progeny - Rr

c) F_2 progeny - RR, Rr and rr

OR

In pea plant, round seed is dominant over the wrinkled. If a cross is carried out between these two plants, give answer to the following questions.

i) Mention the genes for the traits of parents.

ii) State the trait of F_1 hybrids.

iii) Write the ratio of F_2 progeny obtained from this cross. What is the name of the cross?

Ans : i) RR/rr

ii) Rr (hybrid) – Round

iii) 3:1 (phenotypic ratio), 1:2:1 (genotypic ratio)

The name of this cross is monohybrid cross.

Q.18 : In human beings, probability of getting either a male or female child is 50 : 50. Give a suitable explanation for it.

Ans : The sperm determines the sex of the child in human. This is because half of the sperms have X-chromosomes, i.e. (22 + X) and the other half have Y-chromosomes, i.e. (22 + X) and (22 + Y), both in equal numbers. Thus, there is 50% chance of a (22 + Y) boy and 50% chance of a (22 + X) girl being born to the parents. Thus, making the statistical probabiity 50 - 50.

SECTION (D) **(5 marks)**

Q.19 : i) What is genetics?

ii) Give the common name of the plant on which Mendel performed his experiments.

iii) According to Mendel what are the factors?

iv) What are genes? Where are the genes located?

Ans : i) Genetics is the branch of biology dealing with heredity and variation. It is thus defined as the science of heredity and variation.

ii) Mendel performed his experiment on Garden pea plant – Pisum Sativum.

iii) According to Mendel, the characters in pea plant are controlled by certain units, which he called 'factors.'

iv) Genes are the unit of inheritance. Genes are present on the chromosomes.

OR

a) In a monohybrid cross, pink coloured flowers are dominant over white coloured flowers. If parent plants belong to pure breeding dominant trait and pure breeding recessive trait, what will be the phenotype or morphological feature of F1-generation? If F1 plants are self-fertilised, what would be the phenotypic ratio or how many dominant and recessive traits will be produced in the progeny?

b) Mendel choose pea plant for his experiment why?

Ans : a) Let the dominant trait be represented by PP.

Let the recessive trait be represented by pp.

Parents PP × pp

F_1 - greneration (Pp) (Pp) (Pp) (Pp) i.e. all pink colour flowers, but hybrid.

Parents self-fertilised Pp × Pp

F_1 - generation (PP) (Pp) (Pp) (pp)

Ratio 3 pink colour flowers : 1 white colour flower.

b) Mendel choose pea plants for studying inheritance experiments because garden pea have a number of distinct differences in the characters, which are easy to observe like.

i) Length of stem, i.e. tall and short.

ii) They are self-pollinating and a large number of generation can be obtained in short time span.

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