

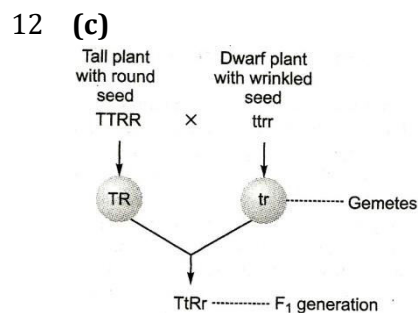
DPP
DAILY PRACTICE PROBLEMSClass : XIIth
Date :**Solutions**Subject : BIOLOGY
DPP No. : 4**Topic :- Principles of Inheritance & Variations**

- 1 (c)
Genetics is the branch of biology which deals with the inheritance and variations
- 2 (c)
Balbani first observed these chromosomes in the salivary glands of midge *Chironomus* in 1881. These polytene chromosomes are considered as somatic giant tubules and also reported from fat bodies some other dipterans also, *e.g., Drosophila, Chironomus, Sciaca, Rhyncosciara, etc.*
- 3 (d)
Sir Archibald Edward Garrod was an English physician, who pioneered the field of inborn errors of metabolism. He was born on November 25, 1857, in London and died on March 28, 1936, in Cambridge.
- 4 (c)
Punnett square is a table, in which all possible combinations of gametes and progeny are displayed in a grid structure.
- 5 (c)
Erythroblastosis foetalis is a haemolytic disease of newborn children. Erythroblastosis foetalis can occur when father is Rh positive and mother is Rh negative. An Rh negative woman can be sensitized when she bears an Rh⁺ child and Rh⁺ children may have erythroblastosis.
- 6 (c)
When F_1 hybrid is crossed with its recessive parents, it is called as **test cross**. By test cross, the heterozygosity and homozygosity of the

organism can be tested. The test cross ratio in monohybrid cross is 1 : 1 and in dihybrid cross, ratio will be 1 : 1 : 1 : 1.

- 7 **(c)**
Inversion involves a reverse order of genes in a part of chromosome.
- 8 **(b)**
The gamete mother cells ($2n$) are called **meiocytes**, which undergo meiosis to form gametes (n). The chromosome number in the meiocytes ($2n$) of housefly is 12.
- 9 **(c)**
Genes which codes for a pair a contrasting traits is called alleles. They are slightly different forms of the same gene, *e. g.*, TT, tt, tT
- 10 **(c)**
Haemophilia and colour blindness are both X-linked recessive diseases. The gene for both is found on X-chromosome only.

Albinism, Sickle-cell anaemia and thalassemia are autosomal diseases.
- 11 **(c)**
Mendel described the inheritance of recessive and dominant genes. Phenylketonuria (PKU) is an autosomal recessive mutation of gene on chromosome-12.



Thus, there is no dwarf plant with wrinkled seeds in F₁-generation.

- 13 **(b)**
The term genetics (*Gk. Genesis*=descent) was

coined by **Bateson** in 1906. Genetics is the study of principles and mechanism of heredity and variations.

14 **(b)**

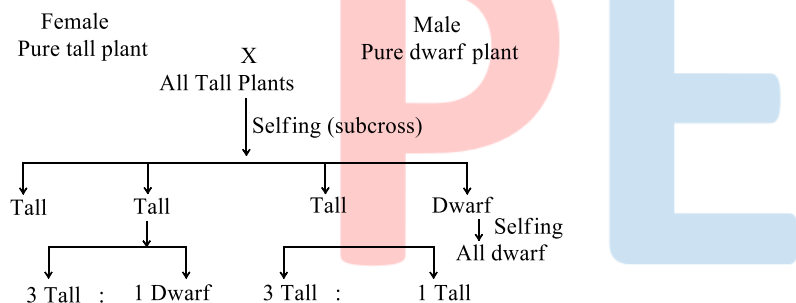
In human beings, 46 chromosomes are found, in which only one pair XY takes part in sex determination. These are known as **sex chromosomes** or **allosomes**, rest 22 pairs are known as **autosomes**.

15 **(a)**

Mendel obtained the recessive character in F_2 by self pollinating the F_1 -plants.

Mendel cross-pollinated a pure tall pea plant (100-120 cm high) and a pure dwarf pea plant. (only 22 to 44 cm high). He called them parental generation, expressed now-a-days by symbol P.

This hybridization popularly called as monohybrid cross



This three generations of pea plants after crossing a pure tall plant with a dwarf one. The plants of F_1 -generation are all tall, of F_2 -generation three tall and one dwarf. One third of the tall plants are pure, while the remaining behave as hybrids

F₁-generation Seeds collected from the parental generation called first filial generation or F_1 -generation

F₂-generation F_1 -plants pollinated among them self (self breeding or inbreeding) and seed produced by F_1 -plants called F_2 -generation. They were in ratio 3:1 (three tall and one dwarf).

F₃-generation Mendel allowed F_2 -plant to form seed by self-pollination called F_3 -generation. Mendel observed that tall and dwarf plant behave differently

- (i) Dwarf plant produced dwarf plant on self-pollinated
- (ii) In tall plants one third plants breed true so they were pure
- (iii) Other two third plant behave like parents and give tall to dwarf plants 3 : 1 indicate that their parents have dwarf genes also

16 (a)

Criss-cross Inheritance It is a type of sex-linked inheritance, where a parent passes the traits to the grand child of the same sex through offspring of the opposite sex, that is, father passes the traits to grandson through his daughter (diagynic), while the mother transfers traits to her grand daughter through her son (dia-andric). It was first studied by Morgan (1910) in case of eye colour in *Drosophila*. Criss-cross inheritance is applicable to most sex-linked disorders in humans, *e. g.*, red green colour blindness, haemophilia

17 (b)

Heterozygous.

The diploid condition in which the alleles at a given locus are identical is called homozygous or pulls. In homozygous condition, organism have two similar genes or alleles for a particular character in homologous pair of chromosomes, *e. g.*, TT or tt.

Organisms containing two different alleles or individual containing both dominant and recessive genes of an allele pair, *e. g.*, Tt is known as heterozygous or hybrid

18 (c)

Mendel conducted artificial pollination/cross pollination using true breeding pea lines A true breeding line is one that having undergone continuous self pollination, shows stable trait inheritance and expression for several generation

19 (d)

Morgan and his group found that when genes were grouped on the same chromosome, some genes were very tightly linked (showed very low recombination), while others were loosely linked

(showed higher recombination).

20 **(b)**

Polygene results in quantitative inheritance, which is characterized by occurrence of intermediate forms between the parental type. In case of crossing between AAB₂B₂C₂ (dark colour) and aabbcc (light colour), in F_2 -generation seven phenotypes will obtain with ratio 1 : 6 : 15 : 20 : 15 : 6 : 1. The total number of progeny is 64, out of which only two will be likely resemble with either parents. Hence, their proportion in F_2 -generation would be 3.12, *i.e.*, less than 5%

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	C	C	D	C	C	C	C	B	C	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	C	B	B	A	A	B	C	D	B