

# DPP

DAILY PRACTICE PROBLEMS

Class : XIIth  
Date :

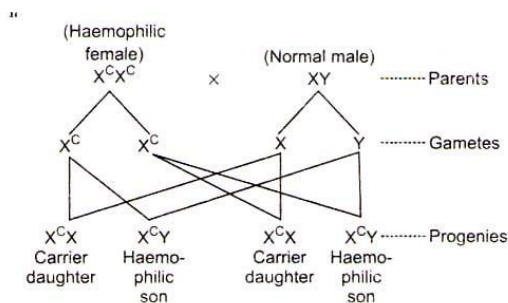
## Solutions

Subject : BIOLOGY  
DPP No. : 10

### Topic :- Principles of Inheritance & Variations

1 (b)

Haemophilia is a recessive X-linked disease. A female with defected single X-chromosome is normal but, carrier of disease, and male with defected single X-chromosome is haemophilic.



2 (a)

*Genetic disorder may be grouped into two categories*

(i) **Mendelian Disorders** These genetic disorder are mainly caused by alternation and mutation in the single gene. They are transmitted to offsprings following the principle of inheritance. Mendelian disorder can be dominant or recessive. *e. g.*, haemophilia, colour blindness, sickle-cell anaemia, cystic fibrosis, phenylketonuria, thalassaemia.

(ii) **Chromosomal Disorders** Chromosomal disorder are caused due to excess, absence, or abnormal arrangement of one or more chromosome, *e. g.*, Turner's syndrome, Down's syndrome, etc

3 (c)

The term gene was coined by **Johanssen**.

4 **(a)**  
A dihybrid cross involves two pairs of contrasting characters, *e.g.*, yellow round seeded plant and wrinkled. Green seeded plant (both pure lines) homozygous. When a dihybrid cross is made between two pure line of homozygous parents, then the  $F_1$  generation shows hybrids with dominant phenotypic effect. When  $F_1$  heterozygous plants are self-fertilized to produce  $F_2$  generation, four types of combinations are obtained of which two are similar to parental combination and other two are new combinations. The phenotypic dihybrid ratio of these four combinations in  $F_2$  generation comes out to be 9 : 3 : 3 : 1, while the genotypic dihybrid ratio is 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1.

5 **(c)**  
Chromosome is made up of DNA and histone proteins.

6 **(d)**  
Baldness is not a sex-limited trait. Baldness is a sex influenced trait.

Linkage is an exception to the principle of independent assortment in heredity.

Galactosemia is a hereditary disease that is caused by the lack of a liver enzyme required to digest galactose.

Small population size results in random genetic drift in population.

7 **(a)**  
The  $F_1$  offsprings of pure tall and pure dwarf are heterozygous tall, which on selfing produces 1 : 1 ratio of breeding tall to breeding dwarf.

8 **(b)**  
Exposure of 'X' rays enhance the frequency of crossing over

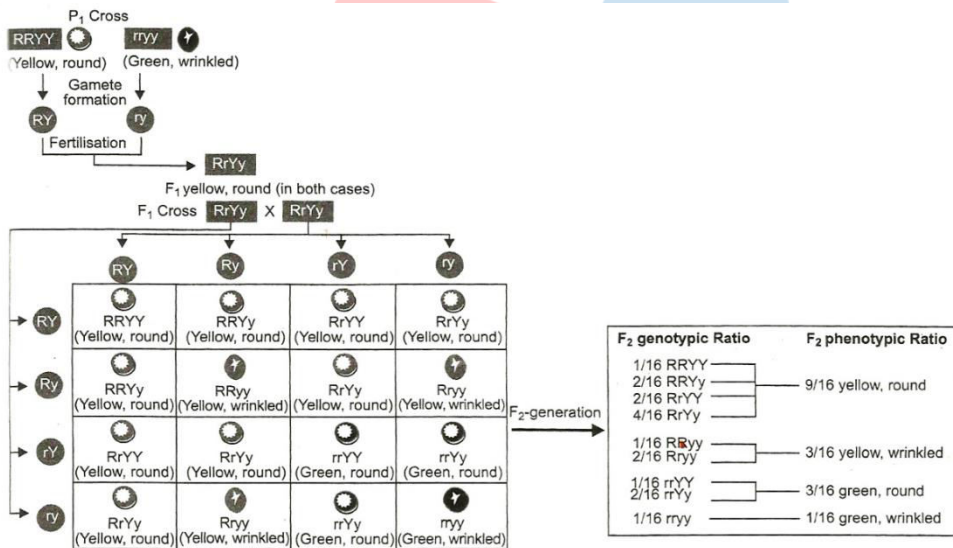
9 **(a)**  
The genotype of trihybrid would be AaBbCc. Eight

different types of gametes ABC, ABc, AbC, Abc, aBC, aBc, abC, abc would be formed. The number of zygotes would be  $8^2 = 64$ .

10 **(b)**  
The genetic composition of an organism, *i.e.*, the combination of all alleles possessed by an organism is called genotype

11 **(d)**  
In polyploidy there are more than one set of chromosomes is present in an organism. It only happens when cytokinesis doesn't take place in proper way

12 **(a)**  
12



A dihybrid cross

in pea plant between yellow round (smooth) seeded and green wrinkled seeded plant. The cross proves the principle of independent assortment

13 **(d)**  
When the F<sub>1</sub>-hybrid (Rr Yy) of a dihybrid cross is test crossed (crossed with double recessive parent rryy), the F<sub>2</sub>-offspring appear in the phenotypic and genotypic ratio of 1 : 1 : 1 : 1 confirming that F<sub>1</sub>-offspring was heterozygous in both the traits. It is a cross

between  $RrYy \times rryy$ .

14 (c)

Allelomorphs or simply called allele represents a pair of contrasting characters

15 (a)

Harmful mutation does not get eliminated from the gene pool because most of the harmful mutations are recessive and they carried by heterozygous condition in the individual. If they (mutation) are dominant then they easily get eliminated by the death of an organism

16 (a)

A-Common, B-Rare

17 (c)

Mendel died in 1884 long before his work came to recognized. It was in 1900 when three worker independently rediscovered the principles of heredity already worked out by Mendel.

They were Hugo de Vries of Holland, Carl Correns of Germany and Eric Tiron and Tschermark of Austria

18 (a)

In gynandromorphs, some cells of body contain XX and some cells XY genotype.

19 (d)

#### Post Mendelian Discoveries

**Gene interaction** is the influence of alleles and nonalleles on the normal phenotypic expression of genes. It is two types, **intragenic** (allelic) and **intergenic** (nonallelic). In the intragenic interaction the two alleles (present on the same gene locus on the two homologous chromosome) of a gene interact in such a way as to produce a phenotypic expression different from typical dominant-recessive phenotype, *e. g.*, incomplete dominance, codominance, multiple alleles.

In intergenic or non-allelic interaction, two or more independent gene present on the same or different chromosomes interact to produce different expression, *e. g.*, epistasis, duplicate genes, complementary genes, supplementary genes, lethal genes, inhibitory genes, etc.

20 (c)

Intermediate inheritance is incomplete dominance in which dominant factor of a heterozygote does not completely mask the expression of recessive allele. In incomplete dominance, genotypic and phenotypic ratio remain the same and is 1 : 2 : 1.

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