DPP
DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

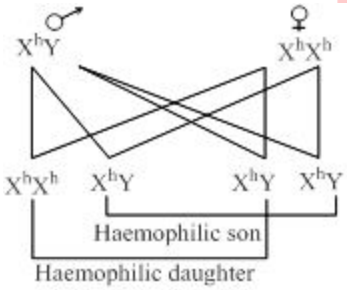
Subject : BIOLOGY
DPP No. : 5

Topic :- Principles of Inheritance & Variations

1 **(a)**
In cancer cells there is uncontrolled cell division. In them chromosomal abbreviation is commonly found

2 **(b)**
The given case is the example of **codominance.**

3 **(d)**
Males and female are haemophilic definately. If their father and mother both are haemophilic



4 **(b)**
Polyploidy is the phenomenon, which leads to increase in the number of chromosomes thus, increasing in the number of genes. Due to cumulative effect of genes, new characters appear, which results into formation of new species.

5 **(b)**
Mendel is called father of genetics. There are three laws of Mendel in respect of inheritance:

1. Law of dominance
2. Law of segregation or Law of purity of gametes or Law of splitting of hybrids.
3. Law of independent assortment

6 **(b)**

Test cross is a cross between F_1 hybrid with its recessive parent.

7 **(a)**

Homogametic.

XY and XY type sex determination seen in many insect and mammals including humans. Males have X and Y chromosome along with autosome and females have pair of 'X' chromosome along with autosome

Parents Phenotypes Male Female

Genotypes 44A + XY 44A + XX

Gametes 22A + X 22A+Y 22A + A22A + X

22A+ X 22A+X

Children 22A + X 44A + XX 44 A + XY Female

22A + Y 44 A + XY 44 A + XY Male

Sex ratio Female : Male = 1 : 1

In plants The flowering plants are mostly bisexual and lack sex chromosomes. The unisexual flowering plants tent to have XX-XY type of sex chromosomal mechanism for sex determination. The female plants are XX and male plants are XY.

XX and XO Type of Sex Determination

Found in insect like grasshopper, cockroaches and bugs. Males have only X sex-chromosome and autosomes, female have pair of X-chromosome and autosome

Parents Phenotypes Male Female

Genotypes $AA + XO$ $AA + XX$

Gametes $A + X, A + O$ $A + X, A + Y$

F_1-generation

	A + X	A + X
A + X	AA + XO	AA + XO
A + O	AA + XO	AA + XO

Genotypes

XX-XO type of sex determination

In most of cases the female produce similar sex chromosome called homomorphic. In most of

cases the male produce dissimilar sex chromosome called hetermorphic

8 **(a)**

In birds, usually female is designated as ZW, being heterogametic and male is designated as ZZ being homogametic.

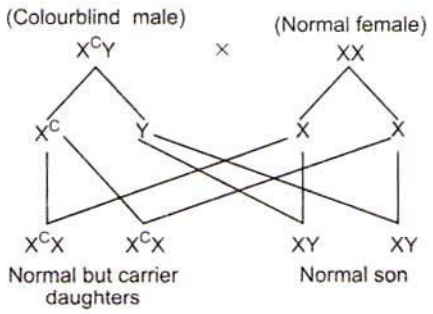
9 **(a)**

A cross of round yellow seeds (both dominant) and green wrinkled seed (both recessive) plants produced 9 : 3 : 3 : 1 ratio of plants (phenotypic)in F_2 generation. The ratio of parental to recombinant is 10 : 6 here because the 9 and 1 are of parental type and 3 & 3 are recombinant.

10 **(a)**

In genetics, a test cross, first introduced by **Gregor Johann Mendel,** is used to determine weather an individual exhibiting a dominant trait is homozygous or heterozygous for that traits. More simply, test cross determines the genotype of an individual with a dominant phenotype. The test cross is defind as being a type of back cross between the recessive homozygote parents and F_1 generation.

11 **(c)**



So, all sons in the progeny will be normal.

12 **(d)**

When a tall pea plant (TT) is crossed with dwarf plant (tt), the F_1progeny shows all plants hybrid tall and on selfing of F_1progeny, the F_2generation

shows both tall and dwarf plant in the ratio 3 : 1. Out of three tall plants, one is pure tall (TT) and two are hybrid tall (Tt).

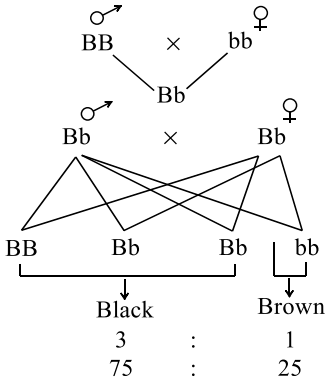
13 **(c)**
A-Two, B-Chromosomal, C-Mutation

14 **(c)**
A-Heterozygous, B-Unaffected, C-Carrier

16 **(c)**
Linkage group will be equal to haploid number of chromosomes. *Pisum sativum* has seven pairs of chromosomes, therefore linkage group is also **seven**.

17 **(d)**
When a cross (dihybrid) is made between plants bearing round yellow (RRYY) and wrinkled green (rryy) seeds, all the plants in F_1-generation are with yellow round seeds (showing the genotype RrYy).

18 **(a)**
Black colour is dominant over the recessive so by cross it is easily infered that 75% of the offspring are black and 25% are brown



19 **(b)**
There are only very few characters, which are present on the Y-chromosome of male. Like hypertrichosis. Given pedigree analysis is the example of Y-linked inheritance because all male progeny is affected

20 **(a)**
Haemophilia.
Genetic or chromosomal symbol used for person

who is having sickle-cell anaemia Ps – Hb^s Hb^s.

Sickle-cell Anaemia

(i) It is an autosome-linked recessive trait

(ii) The disease is controlled by a single pair of allele Hb^s and Hb^s

(iii) Only the homozygous individuals for Hb^s, *i.e.*, Hb^sHb^s show the diseased phenotype

(iv) The heterozygous individuals are carriers (Hb^AHb^S)

(v) Due to point mutation, glutamic acid (Glu) is replaced by valine (Val) at the sixth position of β-globin chain of haemoglobin molecule

(vi) A single base substitution at sixth codon of the beta globulin gene from GAG to GUG. GAG code for glutamic acid and GUG code for valine.

(vii) Hb^S behaves as normal haemoglobin except under the oxygen stress where erythrocytes lose their circular shape and become sickle-shaped. As a result, the cells cannot pass through narrow capillaries. Blood capillaries are clogged and thus, affect blood supply to different organs

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