

DPP

DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : BIOLOGY
DPP No. : 6

Topic :- Principles of Inheritance & Variations

- 1 (b)
Grasshopper is an example of XO type of sex determination in which the males have only one X-chromosome besides the autosomes, whereas females have a pair of X-chromosomes .

- 2 (a)
Tr Rr (heterozygous tall and pink)

↓ (self crossed)

Tt Rr × Tt Rr

Gametes	TR	Tr	tR	tr
TR	TTRR (Red)	TTRr (Pink)	TrRR (Pink)	TrRr (Pink)
Tr	TTRr (Pink)	TTrr	TrRr (Pink)	Ttrr
tR	TrRR	TrRr	ttRR	ttrR (Pink)
tr	TrRr	Ttrr	ttRr (Pink)	ttrr

$\left. \begin{array}{l} 1/16 \text{ TTRR} \\ 2/16 \text{ TTRr} \\ 2/16 \text{ TtRR} \\ 4/16 \text{ TtRr} \end{array} \right\} 9/16 - 75\%$
 $\left. \begin{array}{l} 1/16 \text{ TTrr} \\ 2/16 \text{ Ttrr} \end{array} \right\} 3/16 - 25\%$
 $\left. \begin{array}{l} 2/16 \text{ ttRR} \\ 2/16 \text{ ttRr} \end{array} \right\} 3/16 - 50\%$
 $1/16 \text{ ttrr} \quad 1/16 - 50\%$

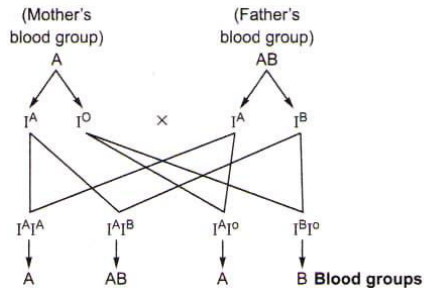
- 3 (d)
Chimera is an individual which has in its body cells of two or more genotypes *i.e.*, pleiotropic mutations. Chimeric individuals produced by transfections arise when some cells of an embryo become stably transfected.

- 4 (c)

Mendel selected 14 pairs of true breeding pea plant varieties for his experiment

- 5 **(a)**
 Syndrome stands for the group of symptoms, which indicates to a particular disease

- 6 **(d)**



Hence, parents with blood group-A and AB will not produce offsprings with blood group-O.

- 7 **(d)**
 Nephrogenic diabetes is due to genetic deficiency of ADH-receptor linked to X-chromosome.
- 8 **(b)**
 Mendel got only parental phenotype in the offspring. He didn't get only intermediate result. So, he could not formulate the blending theory of inheritance or observed linkage and crossing over
- 9 **(a)**
 Mutations are large discontinuous sudden heritable change in the genotype. Mutation are generally **recessive** in nature.
- 10 **(a)**
 Cri-du-chat syndrome (Cat -cry syndrome) was discovered by **Lejeune** in 1963 and is due to the deletion of a large part of the small arm of the 5th autosomes. Deletion is a type of mutation in which a segment is removed from chromosomes or DNA molecules.
- 11 **(c)**
 A-Human; B-Quantitative
- 12 **(d)**
 When a pair of contrasting characters are crossed with each other then F₁-generation has only

one type of character. This expressed character is known as **dominant** character, while the character, which could not express in F_1 -generation is known as **recessive** character. In pea plants, tallness, round seed, yellow seed, purple flower, green pod, inflated pod and axial flower are dominant over dwarfness, wrinkled seed, green seed, white flower, yellow pod, constricted pod and terminal flower, respectively.

13 **(a)**
Genes for cytoplasmic male sterility in plants are located in mitochondrial genome.

14 **(d)**
DNA **transposition** is the process, which involves the movement of DNA elements from one site in the genome to the other. It is mediated by transposase enzymes. These short segments of DNA (DNA elements) with remarkable capacity to move from one location in a chromosome to another, are called **transposons** or **jumping genes** or transposable elements or mobile genetic elements. These were first discovered by **Barbara McClintock** in maize (*Zea mays*) for which she got the Nobel Prize for physiology and medicine.

15 **(a)**
The phenomenon of expression of both the alleles in heterozygote is called codominance. As the result the phenotype is different from both homozygous genotype.

Examples

1. Blood group is the good example codominance
2. ABO blood groups are controlled by gene I. The gene (I) has three allele I^A, I^B, i , I^A, I^B produce slightly different form of sugar while i does not produce any kind of sugar.
3. I^A, I^B are dominant alleles where as i is recessive alleles
4. Since, there are three different allele, there are six different combination of

these three alleles are possible and four phenotypes (A, B, AB and O)

Genetic Basis of Blood Groups in Human Population

Allele from Parent 1	Allele from Parent 2	Genotype of Offspring	Blood Types of Offspring
I^A	I^A	$I^A I^A$	A
I^A	I^B	$I^A I^B$	AB
I^A	i	$I^A i$	A
I^B	I^A	$I^A I^B$	AB
I^B	I^B	$I^B I^B$	B
I^B	i	$I^B i$	B
i	i	ii	O

When I^A and I^B are present together they both express their own types of sugars this is because of co-dominance. ABO blood grouping also provides a good example of multiple alleles.

Here, you can see that there are more than two, *i.e.*, three alleles governing the same character. Since, in an individual only two alleles can be present multiple alleles can be found only when population studies are made. Dominance is not an autonomous feature of a gene. It depends on much on the gene product

- 16 **(c)**
If pedigree initiated from male it is called propositus. If pedigree initiated from female it is called propiستا. So, individual from which a pedigree initiated could be proband or propositus
- 17 **(a)**
Hugo de Vries used *Oenothera lamarckiana* for his mutation experiment.
- 18 **(b)**
Phenylketonuria is due to deficiency of liver enzyme phenylalanine hydroxylase.
- 19 **(a)**
Haemophilia is a sex-linked character (X-linked recessive trait). It is a rare human blood disorder, in which, blood clotting is deficient, resulting in

severe bleeding internally and externally. The condition is due to lack of fibrin in the blood and is controlled by two closely linked genes on the blood and is controlled by two closely linked genes on the X-chromosome that are responsible for the production of different clotting factors.

20 **(b)**

A cross between two individuals for studying inheritance of two characters is known as dihybrid cross. The phenotypic ratio in F_2 -generation of a dihybrid cross is 9 : 3 : 3 : 1, therefore, the maximum number of different phenotypes available are four.

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