

**EXERCISE**

1. On which plant Mendel had carried out his investigations :-  
 (1) Garden - pea                      (2) Wild pea  
 (3) Cow-pea                              (4) Pigeon pea
2. During breeding the removal of anthers from a flower is called :-  
 (1) Anthesis                              (2) Pollination  
 (3) Emasculation                      (4) Vasectomy
3. In monohybrid cross what is the ratio of homozygous dominant and homozygous recessive individuals in  $F_2$ -generation :-  
 (1) 1:2:1                                  (2) 2:1 / 1:2  
 (3) 3:1 / 1:3                              (4) 1:1
4. What is the genotypic and phenotypic ratio of monohybrid test cross :-  
 (1) 1:1                                      (2) 1:2  
 (3) 3:1                                      (4) 1:2:1
5. How many types & in what ratio the gametes are produced by a dihybrid heterozygous :-  
 (1) 4 types in the ratio of 9:3:3:1  
 (2) 2 types in the ratio of 3:1  
 (3) 3 types in the ratio of 1:2:1  
 (4) 4 types in the ratio of 1:1:1:1
6. Which genotype represents a true dihybrid condition  
 (1) tt rr                                      (2) Tt rr  
 (3) Tt Rr                                      (4) TT Rr
7. In a cross between a pure tall plant with green pod & a pure short plant with yellow pod. How many short plants are produced in  $F_2$  generation out of 16 :-  
 (1) 1    (2) 3  
 (3) 4    (4) 9
8. In a dihybrid cross between AABB and aabb the ratio of AABB, AABb, aaBb, aabb in  $F_2$  generation is :-  
 (1) 9:3:3:1                              (2) 1:1:1:1  
 (3) 1:2:2:1                              (4) 1:1:2:2
9. Who rediscovered the results of Mendel's experiments :-  
 (1) DeVries, Tschemark, Correns  
 (2) DeVries, Tschemark, Morgan  
 (3) Tschemark, Morgan, Correns  
 (4) Tschemark, Bateson, Punnet,
10. If 120 Plants are produced on crossing pure red and pure white flowered pea plants, than the ratio of offsprings will be :-  
 (1) 90 Red : 30 White              (2) 30 Red : 90 White  
 (3) 60 Red : 60 White              (4) All Red
11. An individual with two identical members of a pair of genetic factors is called :-  
 (1) Heteromorphic                      (2) Heterozygote  
 (3) Homomorphic                      (4) Homozygote
12. Two allelic genes are located on :  
 (1) The same chromosome  
 (2) Two homologous chromosomes  
 (3) Two-non-homologous chromosomes  
 (4) Any two chromosomes
13. When two hybrids Ttrr & Rrtt are crossed, the phenotypic ratio of offspring shell be :-  
 (1) 3:1                                      (2) 1:1:1:1  
 (3) 1:1                                      (4) 9:3:3:1
14. How many plants are dihybrid in  $F_2$  generation of dihybrid cross :-  
 (1) One                                      (2) Two  
 (3) Four                                      (4) Sixteen
15. When a plant have two alleles of contrasting characters it is called :-  
 (1) Homozygous                      (2) Dioecious  
 (3) Heterozygous                      (4) Monoecious
16. Heterozygous tall plants were crossed with dwarf plants. what will be the ratio of dwarf plants in the progeny :-  
 (1) 50%                                      (2) 25%  
 (3) 75%                                      (4) 100%
17. A pure tall plant can be differentiated from a hybrid tall plant :  
 (1) By measuring length of plant  
 (2) By spraying gibberalins  
 (3) If all plants are tall after self-pollination  
 (4) If all plants are dwarf after self-pollination
18. Genetic constitution of an individual is represented by :-  
 (1) Genome                              (2) Genotype  
 (3) Phenotype                              (4) Karyotype

# PRINCIPLES OF INHERITANCE AND VARIATIONS

- 19.** Genes do not occur in pairs in :-  
(1) Zygote (2) Somatic cell  
(3) Embryo (4) Gametes
- 20.** "Like begets like" an important and universal phenomenon of life, is due to :-  
(1) Eugenics (2) Inheritance  
(3) dominance (4) Crossing-over
- 21.** How many types of gametes are expected from the organism with genotype AABBCC:-  
(1) One (2) Two  
(3) Four (4) Eight
- 22.** According to Mendelism which character is showing dominance-  
(1) Terminal position of flower  
(2) Green colour in seed coat  
(3) Wrinkled seeds  
(4) Green pod colour
- 23.** Due to the cross between  $TTRr \times ttrr$  the resultant progenies showed how many percent plants would be, tall, red flowered :-  
(1) 50% (2) 75%  
(3) 25% (4) 100%
- 24.** A gene said to be dominant if :-  
(1) It express it's effect only in homozygous stage.  
(2) It expressed only in heterozygous condition  
(3) It expressed both in homozygous and heterozygous condition.  
(4) It never expressed in any condition.
- 25.** Which one of the following traits of garden pea studied by Mendel, was a recessive feature:-  
(1) Axial flower position  
(2) Green seed colour  
(3) Green pod colour  
(4) Round seed shape
- 26.** If a heterozygous tall plant is crossed with a homozygous dwarf plant then what shall be the percentage of dwarf in offspring :-  
(1) 25% (2) 100%  
(3) 75% (4) 50%
- 27.** If a homozygous tall plant is crossed with a dwarf plant, what shall be the ratio of plants in offsprings :-  
(1) All heterozygous tall  
(2) Two tall & Two dwarf  
(3) 1:2:1  
(4) All homozygous dwarf
- 28.** In order to find out the different types of gametes produced by a pea plant having the genotype AaBb, it should be crossed to a plant with the genotype  
(1) AaBb (2) aabb  
(3) AABB (4) aaBB
- 29.** Law of independent assortment of Mendel was proved by :-  
(1) Monohybrid cross (2) Reciprocal cross  
(3) Dihybrid cross (4) Back cross
- 30.** If selfing occurs in the plant having genotype RrYy, then ratio of given genotype will be :- RRYy, RrYY, RRYy, RrYy  
(1) 1:2:2:4 (2) 1:2:2:1  
(3) 1:1:1:1 (4) 2:2:2:1
- 31.** A trihybrid cross involve three pair of characters which will give rise to the  $F_1$  hybrids which are heterozygous for three genes. How many types of gametes will be produced in both male and female-  
(1) 2 (2) 4 (3) 6 (4) 8
- 32.** When an  $F_1$  individual is crossed with its either of the two parent. Then it is known as :-  
(1) Test cross (2) Back cross  
(3) Reciprocal cross (4) Monohybrid cross
- 33.** How many types of genotypes are formed in  $F_2$  progeny obtained from self polination of a dihybrid  $F_1$  :-  
(1) 9 (2) 3 (3) 6 (4) 1
- 34.** A test cross is performed :  
(1) by selfing of  $F_2$ -generation plants  
(2) by selfing of  $F_1$ -generation plants  
(3) to determine whether  $F_1$ -plant is homozygous or heterozygous  
(4) between a homozygous dominant and homozygous recessive plant
- 35.** If a cross is made between AA and aa, the nature of  $F_1$  progeny will be :-  
(1) genotypically AA, phenotypically a  
(2) genotypically Aa, phenotypically a  
(3) genotypically Aa, phenotypically A  
(4) genotypically aa, phenotypically A



# PRINCIPLES OF INHERITANCE AND VARIATIONS

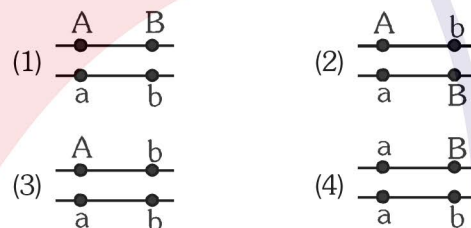
51. ABO blood group is an example of :-  
(1) Epistasis (2) Multiple allelism  
(3) Pleiotropism (4) Complementary genes
52. A child is blood group is 'O'. His parents blood group can not be :-  
(1) B & O (2) A & O (3) AB (4) A & B
53. If one parent has blood group A and the other parent has blood group B. The offsprings have which blood group :-  
(1) AB only (2) O only  
(3) B only (4) A, B, AB, O
54. A child of O blood group, has B-blood group father, the genotype of father would be :-  
(1)  $I^O I^O$  (2)  $I^B I^B$  (3)  $I^A I^B$  (4)  $I^B I^O$
55. A gene that shows it's effect on more than one character is :-  
(1) Polygene  
(2) Pleotropic gene  
(3) Multifactor gene  
(4) Multiple gene
56. Blood grouping in humans is controlled by:-  
(1) 4 alleles in which  $I^A$  is dominant  
(2) 3 alleles in which  $I^A$  and  $I^B$  are dominant  
(3) 2 alleles in which none is dominant  
(4) 3 alleles in which  $I^A$  is recessive
57. Multiple alleles are present :-  
(1) In different chromosomes  
(2) At different loci on chromosome  
(3) At the same locus on homologous chromosomes  
(4) At the non homologous chromosome
58. What would be the colour of flower in  $F_1$  progeny as a result of cross between homozygous red and homozygous white flowered *Snapdragon* :-  
(1) Red (2) White  
(3) Red and White (4) Pink
59. In *Mirabilis* red (RR) and white (rr) flower produces pink (Rr) flower. A plant with pink flower is crossed with white flower the expected phenotypic ratio is :-  
(1) red : pink : white (1 : 2: 1)  
(2) pink : white (1 : 1)  
(3) red : pink (1 : 1)  
(4) red : white (3 : 1)
50. The possible blood groups of children born to parents having A and AB groups are :-  
(1) O, A (2) A, B, AB  
(3) O, A, B (4) O, A, B, AB
61. A man with blood group B marries a female with blood group A and their first child is having blood group B. What is the genotype of child :-  
(1)  $I^A I^B$  (2)  $I^A I^O$  (3)  $I^B I^O$  (4)  $I^B I^B$
62. A child with mother of blood group A and father of blood group AB, will not have which of the following blood group :-  
(1) A (2) B (3) AB (4) O
63. If mother has blood group B, father has A group, the offspring will be of :-  
(1) A (2) O  
(3) AB (4) any of the above
64. Two nonallelic genes produces the new phenotype when present together but fail to do so independently then it is called :-  
(1) Epistasis  
(2) Polygene  
(3) Non complimentary gene  
(4) Complimentary gene
65. Sickel cell anemia is the result of \_\_\_\_\_ mutation in the haemoglobin gene :-  
(1) frame shift (2) deletion  
(3) point (4) none of the above
66. When both alleles of a pair are fully expressed in a heterozygote, they are called :-  
(1) Lethals  
(2) Co-dominants  
(3) Semi-dominants  
(4) Recessive allele
67. The three different alleles of human ABO blood types will produce how many genotypes & phenotypes respectively-  
(1) 4 & 6 (2) 6 & 4  
(3) 6 & 6 (4) 4 & 4
68. In sickle cell anaemia-  
(1) The mutant haemoglobin molecule undergoes polymerisation under low oxygen tension causing the change in the shape of RBC  
(2) Substitution of Glutamic acid by valine at the sixth position of the  $\alpha$ -chain of haemoglobin  
(3) The mutant haemoglobin undergoes polymerization under high oxygen tension causing the change in shape of RBC  
(4)  $\alpha$ -globin chain is modified

- 69.** In case of ABO blood group allele  $I^A$  and  $I^B$  if present together then –
- (1) Only  $I^A$  allele expresses
  - (2) Only  $I^B$  allele expresses
  - (3) Both  $I^A$  and  $I^B$  alleles express
  - (4) None of these
- 70.** A colourblind man marries a normal lady whose father was colour blind. If it produces two sons & two daughters, how many of them would be suffer
- (1) Both sons
  - (2) Both daughters
  - (3) One son & one daughter
  - (4) Both sons & both daughters
- 71.** Hypertrichosis is :-
- (1) Holandric character
  - (2) X-Linked character
  - (3) Diagenic character
  - (4) Sex-influenced character
- 72.** Which of the following is not a sex linked characters
- (1) Haemophilia
  - (2) Colour blindness
  - (3) Hypertrichosis
  - (4) Baldness
- 73.** The condition in which only one allele of a pair is present in a diploid organism is known as :-
- (1) Homozygous
  - (2) Heterozygous
  - (3) Hemizygous
  - (4) Incomplete dominance
- 74.** Baldness in man is a :-
- (1) Autosomal character
  - (2) Sex linked character
  - (3) Sex influenced character
  - (4) 1 and 3 both
- 75.** A colourblind man marries a daughter of colourblind father, then in the offsprings :-
- (1) All sons are colourblind
  - (2) All daughters are colourblind
  - (3) Half sons are colourblind
  - (4) No daughter is colourblind
- 76.** In a cross between individuals homozygous for (a, b) and wild type (+ +). In this cross 700 out of 1000 individuals were of parental type. Then the distance between a and b is :-
- (1) 70 map unit
  - (2) 35 map unit
  - (3) 30 map unit
  - (4) 15 map unit
- 77.** There are three genes a, b, c percentage of crossing over between a and b is 20%, b and c is 28% and a and c is 8%. What is the sequence of genes on chromosome
- (1) b, a, c
  - (2) a, b, c
  - (3) a, c, b
  - (4) None

- 78.** The recessive genes located on X–chromosome in humans are always :-
- (1) Expressed in females
  - (2) Lethal
  - (3) Sub-lethal
  - (4) Expressed in males

- 79.** If father shows normal genotype and mother shows a carrier trait for haemophilia
- (1) All the female children will be carrier
  - (2) A male child has 50% chances of active disease
  - (3) Female child has probability of 50% to active disease
  - (4) All the female children will be colourblind

- 80.** Which of the following show linkage group in coupling phase :-

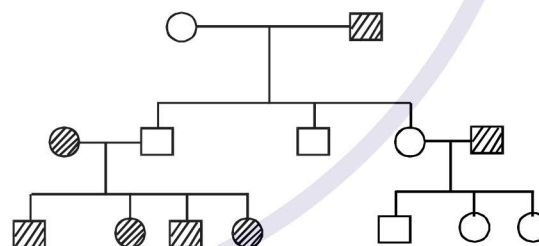


- 81.** Haemophilia is more commonly seen in human males than in human females because –
- (1) This disease is due to a Y–linked recessive mutation
  - (2) This disease is due to an X–linked recessive mutation
  - (3) This disease is due to an X–linked dominant mutation
  - (4) A greater proportion of girls die in infancy
- 82.** If Mendel has chosen to study traits determined by linked genes he would not have discovered
- (1) Law of segregation
  - (2) Law of dominance
  - (3) Law of independent assortment
  - (4) Law of unit character
- 83.** If Mendel might have studies 7 pairs of characters in a plant with 12 chromosomes. instead of 14, then :-
- (1) He could not discover independent assortment
  - (2) He might have not discovered linkage
  - (3) He might have discovered crossing-over
  - (4) He might have not observed dominance

# PRINCIPLES OF INHERITANCE AND VARIATIONS

- 84.** A diseased man marries a normal woman. They get three daughters and five sons. All the daughters were diseased and sons were normal. The gene of this disease is :-  
 (1) Sex linked dominant  
 (2) Sex linked recessive  
 (3) Sex limited character  
 (4) Autosomal dominant
- 85.** Who postulated the 'Chromosome Theory of Inheritance' :-  
 (1) De Vries (2) Mendel  
 (3) Sutton and Boveri (4) Morgan
- 86.** Experimental verification of the chromosomal theory of inheritance done by Thomas Hunt Morgan and his colleagues they worked with -  
 (1) Pea plant (2) Sweet pea plant  
 (3) Snapdragon (4) Drosophila
- 87.** Which is incorrect for Drosophila melanogaster  
 (1) They could be grown on simple synthetic medium  
 (2) Single mating could produce a large number of progeny  
 (3) They complete their life cycle in about 7 weeks  
 (4) There was a clear differentiation of the sexes.
- 88.** The experimental verification of the chromosomal theory of inheritance by-  
 (1) Boveri (2) Sutton  
 (3) T.H. Morgan (4) Bateson
- 89.** Which of the following possess homogametic male  
 (1) Plants (2) Man  
 (3) Insect (4) Birds
- 90.** Which chromosome set is found in male grass hopper :-  
 (1) 2A + XY (2) 2A + XO  
 (3) 2A + YY (4) 2A + XX
- 91.** Which of the following symbols are used for representing sex chromosome of birds :-  
 (1) ZZ - ZW (2) XX - XY  
 (3) XO - XX (4) ZZ - WW
- 92.** If somatic cells of a human male contain single Barrbody, the genetic composition of the person would be :-  
 (1) XYY (2) XXY (3) XO (4) XXXY
- 93.** In which organism female is homogametic & also have one chromosome more than male.  
 (1) Birds (2) Drosophila  
 (3) Chicks (4) Grasshopper

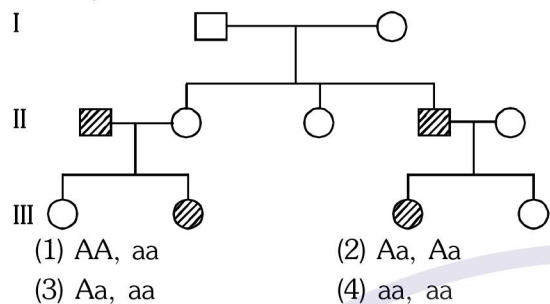
- 94.** In which of the following sex is determined by female individual -  
 (1) Human  
 (2) Drosophila  
 (3) Birds  
 (4) Grasshopper
- 95.** Male heterogamy found in case of  
 (1) XO type male in Grasshopper  
 (2) XY type male in human  
 (3) ZW male in birds  
 (4) 1 and 2 both
- 96.** There are two alleles ( $A_1$  &  $A_2$ ) out of which one ( $A_1$ ) has nil abundance in a population then the abundance of second allele ( $A_2$ ) is :-  
 (1) 0.25 (2) 1.00  
 (3) 0.40 (4) 0.50
- 97.** Probability of four sons to a couple is :-  
 (1)  $\frac{1}{4}$  (2)  $\frac{1}{8}$  (3)  $\frac{1}{16}$  (4)  $\frac{1}{32}$
- 98.** In a random mating population of 28,800 individuals percentage of dominant homozygous individuals is 49% find out the percentage of heterozygous individual -  
 (1) 21% (2) 42% (3) 32% (4) 9%
- 99.** Study the given pedigree carefully, the trait indicated is :-



- : Normal male  
 ■ : Affected male  
 ○ : Normal female  
 ● : Affected female
- (1) Autosomal recessive  
 (2) X-linked recessive  
 (3) Maternal inheritance  
 (4) Paternal inheritance

# PRINCIPLES OF INHERITANCE AND VARIATIONS

**100.** A pedigree is shown below for a disease that is autosomal recessive. The genetic make up of the first generation :-



**101.** In a random mating population frequency of disease causing recessive allele is 80%. What would be the frequency of carrier individual in population :-

- (1) 64%    (2) 32%    (3) 16%    (4) 100%

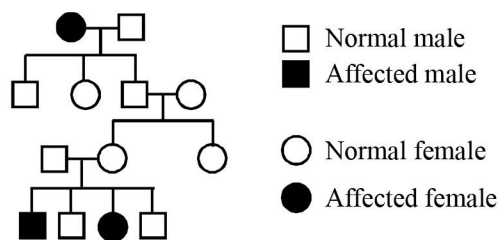
**102.** In a random mating population frequency of dominant allele is 0.7. What will be the frequency of recessive phenotype :-

- (1) 0.49    (2) 0.09    (3) 0.3    (4) 0.21

**103.** At a particular locus, frequency of 'A' allele is 0.6 and that of 'a' is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium -

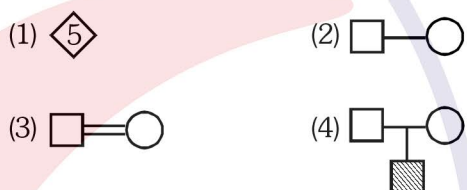
- (1) 0.24    (2) 0.16    (3) 0.48    (4) 0.36

**104.** Study the pedigree given below and assign the type of inheritance of the trait.



- (1) X-linked recessive  
(2) Y-linked  
(3) autosomal recessive  
(4) autosomal dominant

**105.** Which of the following symbol is used for mating between relatives (Consanguineous mating)



## ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	3	4	1	4	3	3	3	1	4	4	2	2	3	3
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	1	3	2	4	2	1	4	1	3	2	4	1	2	3	1
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	4	2	1	3	3	1	3	2	3	3	2	3	1	2	1
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	4	2	3	1	2	3	4	4	2	2	3	4	2	2
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	3	4	4	4	3	2	2	1	3	3	1	4	3	4	3
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	2	1	4	2	1	2	3	1	1	3	4	3	3	4	2
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	1	2	4	3	4	2	3	2	3	2	2	2	3	3	3