

MULTIPLE CHOICE QUESTIONS  
PRINCIPLES OF INHERITANCE AND VARIATION

1. Individuals having dissimilar traits (alleles) on homologous chromosomes are called
  - a) Heterozygous
  - b) Homozygous
  - c) Dominant
  - d) Recessive
  
2. An allele is considered dominant
  - a) When it expresses in homozygosity
  - b) When it expresses even in the presence of alternate allele
  - c) When it expresses desirable phenotype
  - d) Both (b) and (c)
  
3. Mendel's dihybrid ratio is
  - a) 1:1:1:1
  - b) 3:1
  - c) 9:3:3:1
  - d) 9:1:1:5
  
4. Mendel studied seven contrasting characters for his breeding experiment with *Pisum sativum*, which of the following characters did he not use?
  - a) Pod shape
  - b) Leaf shape
  - c) Plant height
  - d) Pod color
  
5. An organism with two identical alleles of a gene in a cell is called
  - a) Heterozygous
  - b) Homozygous
  - c) Hybrid
  - d) Homozygous
  
6. Which principle of inheritance was not given by Mendel
  - a) Independent assortment
  - b) Dominance
  - c) Purity of gametes
  - d) Linkage
  
7. When dominant BB and recessive bb is crossed, the percentage of progeny showing the parental genotype is
  - a) 0%
  - b) 25%
  - c) 50%
  - d) 75%

8. The year 1900AD is highly significant for genetics due to

- a)Chromosome theory of heredity
- b) Discovery of genes
- c) Rediscovery of Mendelism
- d)Principle of linkage

9. The process by which the segregation of Mendelian factors takes place is

- a)Hybridisation
- b)Mitosis
- c)Meiosis
- d) Fertilisation

10. Which would most probably be the genetic makeup of the parents of a colour blind daughter?

- a)Carrier mother and normal father
- b) Carrier mother and color blind father
- c) Color blind mother and normal father
- d)Normal mother and normal father

11. If a heterozygous tall plant is crossed with a homozygous dwarf plant the proportion of dwarf progeny will be

- a)25%
- b)50%
- c)75%
- d)100%

12. When two tall plants are crossed 45 tall plants and 14 dwarf plants are obtained.The genotype of parent plants is

- a)TT x TT
- b)TT x tt
- c)Tt x Tt
- d)TT x Tt

13.Which of the following is not a dominant character selected by Mendel in Pisum?

- a) Yellow pod color
- b) Violet flower colour
- c) Axillary flowers
- d) Yellow seed colour

14. Variation can occur due to

- a) Mutations
- b) Recombination
- c) Fertilisation
- d) All of these

15. Who discovered the phenomenon of incomplete dominance in *Mirabilis* and *Antirrhinum*?

- a) De Vries
- b) Bateson
- c) Carl Correns

d) Davenport

16. How many types of gametes are produced by a trihybrid?

- a) 3
- b) 4
- c) 8
- d) 16

17. A dihybrid heterozygous tall plant with round seed is crossed with a similar genotype, what percentage of plants should possess Tt Rr genotype?

- a) 6.25%
- b) 12.5%
- c) 25%
- d) 75%

18. A cross by changing the source of ovum is

- a) Back cross
- b) Test cross
- c) Monohybrid
- d) Reciprocal cross

19. When the phenotypic and genotypic ratios resemble in the F<sub>2</sub> generation it is an example of

- a) Independent assortment
- b) Qualitative inheritance
- c) Segregation
- d) Incomplete dominance

20. In what situation, the phenotype of a dihybrid cross would exhibit parental combination of characters in more than the expected value and recombination in less than the expected value?

- a) When genes are in mitochondria
- b) When duplicate genes are present
- c) When genes are linked
- d) When supplementary genes are present

21. When the dihybrid Tt rr plants are self-fertilized, what percentage of descendants would be heterozygous for one character and homozygous for another?

- a) 25%
- b) 50%
- c) 75%
- d) 100%

22. In a double heterozygous plant, (Eg: Aa Bb) four types of gametes are produced. This illustrates the law of

- a) Dominance
- b) Segregation
- c) Purity of gametes
- d) Independent assortment

23. Back cross with recessive parent is called

- a) Monohybrid cross
- b) Multiple cross
- c) Single cross
- d) Test cross

24. If a gene has multiple effects, it is called

- a) Multiple allelism
- b) Pleiotropism
- c) Polygeny
- d) Epistasis

25. Maize has 10 pairs of chromosomes. How many linkage groups should it possess

- a) 5
- b) 10
- c) 20
- d) 40

26. Linked genes may be separated by

- a) Gene mutation
- b) Polyploidy
- c) Segregation
- d) Crossing over

27. Crossing over in diploid organism is responsible for

- a) Recombination of linked gene
- b) Segregation of alleles
- c) Dominance of genes
- d) Linkage between genes

28. Crossing over takes place between

- a) Sister chromatids of homologous chromosomes
- b) Non sister chromatids of homologous chromosomes
- c) Sisters of non-homologous chromosomes
- d) DNA and RNA

29. If the distance between genes on a chromosome is more , the linkage strength is

- a) More
- b) Less
- c) Unaffected
- d) More in somatic cells

30. *Drosophila melanogaster* has

- a) 2 pairs of autosomes and 1 pair of sex chromosomes
- b) 3 pairs of autosomes and 1 pair of sex chromosomes
- c) 1 pair of autosomes and 3 pairs of sex chromosomes
- d) 2 pairs of autosomes and 2 pairs of sex chromosomes

31. A trisomic individual has a chromosomal number of

- a)  $2n - 1$
- b)  $2n + 2$
- c)  $2n + 1$
- d)  $2n + 3$

32. Among the following which one is the best chemical for inducing the polyploidy?

- a) Ethylene
- b) Colchicine
- c) Acridines
- d) Mustard gas

33. Down's syndrome is an example of

- a) Monosomy
- b) Trisomy
- c) Triploidy
- d) Eupolyploidy

34. Which of the following is 6x (hexaploid) wheat?

- a) *Triticum durum*
- b) *T. monococcum*
- c) *T. aestivum*
- d) Triticale

35. The holandric genes are located on

- a) Mitochondria
- b) X- chromosome
- c) Y-chromosome
- d) Polytene chromosome

36. If the haploid number of chromosomes in a plant is 12, then the number of chromosomes in monosomic is

- a) 22
- b) 23
- c) 25
- d) 26

37. Alleles are paired in

- a) In zygote
- b) In diploid organism
- c) Dihybrid
- d) All of these

38. Inheritance of flower colour is an example of incomplete dominance, which is seen in:

- a) *Antirrhinum*
- b) *Pisum*
- c) *Solanum*
- d) *Hibiscus*

39. Haemophilia most likely originated as a result of

- a) The separation of two homologous chromosomes
- b) A non disjunction of chromosome number 21
- c) The crossing over to two sex chromosomes
- d) A gene mutation in the X- chromosome

40. Chromosome complement with  $2n-1$  is called as

- a) Monosomy
- b) Trisomy
- c) Nullisomy
- d) Tetrasomy

41. The most striking example of point mutation is found in a disease called

- a) Night blindness
- b) Turners syndrome
- c) Down's syndrome
- d) Sickle cell anemia

42. In which of the following, females are heterogametic

- A) Humans
- b) Grasshopper
- c) Drosophila
- d) Fowl

43. Gynaecomastia is a common feature seen in:

- a) Down's syndrome
- b) Turner's syndrome
- c) Cystic fibrosis
- d) Klinefelter's syndrome

44. XO type of sex determination is seen in:

- a) Man
- b) Grasshopper
- c) Drosophila
- d) Birds

45. Which of the following is not a Mendelian disorder?

- a) Haemophilia
- b) Cystic fibrosis
- c) Thalassemia
- d) Turner's syndrome

46. How many type of phenotypes possible for ABO blood group

- a) 2
- b) 3
- c) 4
- d) 1

47. A person affected with phenylketonuria, lacks an enzyme that converts the amino acid phenylalanine into

- a) Valine
- b) Proline
- c) Histidine
- d) Tyrosine

48. Haemophilia in man is due to

- a) Sex-linked inheritance
- b) Sex-limited inheritance
- c) Sex-influenced inheritance
- d) Primary non-disjunction

49. In XO type of sex determination

- a) Females produce two different types of gametes
- b) Males produce two different types of gametes
- c) Females produce gametes with Y chromosome
- d) Males produce single type of gametes

50. Which one of the following cannot be explained on the basis of Mendel's Law of Dominance?

- a) Factors occur in pairs
- b) The discrete unit controlling a particular character is called a factor
- c) Out of one pair of factors one is dominant, and the other recessive
- d) Alleles do not show any blending and both the characters recover as such in F<sub>2</sub> generation

51. The genotype of a plant showing the dominant phenotype can be determined by :

- a) Back cross
- b) Test cross
- c) Dihybrid cross
- d) Pedigree analysis

52. Which one of the following conditions correctly describes the manner of determining the sex in the given example?

- a) XO condition in humans as found in Turner syndrome, determines female sex
- b) Homozygous sex chromosomes (XX) produce male in Drosophila
- c) Homozygous sex chromosomes (ZZ) determine female sex in birds
- d) XO type of sex chromosomes determine male sex in grasshopper

53. F<sub>2</sub> generation in a Mendelian cross showed that both genotypic and phenotypic ratios are same as 1:2:1. It represents a case of

- a) Monohybrid cross with complete dominance
- b) Monohybrid cross with incomplete dominance
- c) Co-dominance
- d) Dihybrid cross

54. Alleles which can express only in pair with similar allele is

- a) Dominant
- b) Recessive

- c) Co dominant
- d) Lethal

55. Among the following traits that Mendel studied , choose the recessive one

- a) Yellow pods
- b) Axile flower
- c) Terminal flower
- d) Green seed

56. When a dominant 'AA' and a recessive 'aa' are crossed percentage of the progenies showing the parental genotypes will be

- a) 0%
- b) 25%
- c) 50%
- d) 100%

57. A normal visioned man whose father was colour blind ,marries a women whose father is also colour blind . They have their first child as a daughter . What are the chances that this child would be colour blind?

- a) 25%
- b) 50%
- c) 100%
- d) 0%

58. The incorrect statement with regard to Haemophilia is

- a) It is sex linked disease
- b) It is a recessive disease
- c) It is a dominant disease
- d) A single protein involved in the clotting of blood is affected

59. Person with blood group AB is considered as universal recipient because he has

- a) Both A and B antibodies in the plasma
- b) No antigen on RBC and no antibody in the plasma
- c) Both A and B antigens in the plasma but no antibodies in the plasma
- d) Both A and B antigens on RBC but no antibodies in the plasma

60. A patient with unknown blood group needs immediate blood transfusion. The group that can be donated will be

- a) Blood group O
- b) Blood group AB
- c) Blood group A
- d) Blood group B

61. Which Mendelian idea is depicted by a cross in which the F1 generation resembles both parents

- a) Incomplete dominance
- b) Inheritance of 1 gene
- c) Co-dominance
- d) Multiple allelism



62. An F<sub>2</sub> hybrid generation will have

- a) 4 types of genotypes
- b) 7 types of genotypes
- c) 9 types of genotypes
- d) 16 types of genotypes

63. Who among the following is not concerned with re-discovery of Mendelism

- a) Von Tschermak
- b) Carl Correns
- c) Theodre Boveri
- d) Hugode Vries

64. The diploid number of drosophila melanogaster

- a) 4
- b) 8
- c) 16
- d) 12

65. Linkage phenomenon explained first by

- a) William Batson
- b) T.H.Morgan
- c) Alfsed Sturtevent
- d) Johanson

66. Who put forward the crossing theory of recombination

- a) Gregor Mendel
- b) Wiliam Bateson
- c) Janssen
- d) T.H.Morgan

67. In honeybees

- a) The males have only one set of chromosomes
- b) The males have single sex chromosomes
- c) Males produce progeny by parthenogenesis
- d) Both (a) and (c)

68. First child of a normal couple is phenylketouric. The probability of second male child is affected will be

- a) 0%
- b) 25%
- c) 50%
- d) 100%

69. Mutation of any single gene maybe

- a) Micromutation
- b) Point mutation
- c) Gene mutation
- d) All of these

70. A normal man whose father was haemophilic marries a woman whose father was haemophilic. They have their first child as daughter. What is the chance that this could be

- a) 25%
- b) 50%
- c) 0%
- d) 100%

71. Thalassemia beta is located on

- a) 11th chromosome
- b) 16th chromosome
- c) 9th chromosome
- d) 12th chromosome

72. Choose the sex influenced trait

- a) Ovary in female
- b) Hypertrichosis
- c) Haemophilia
- d) Pattern baldness

73. Clotting factor VIII is absent in

- a) Haemophilia A
- b) Haemophilia B
- c) Thalassemia beta
- d) Both (a) and (b)

74. Pedigree analysis is useful for

- a) Study of inheritance when arranged mating is not possible
- b) Study of sex linked inheritance in man
- c) Study of Mendelian disorders in man
- d) All of these

75. Choose the incorrect statement regarding haemophilia

- a) It is x-linked
- b) It is dominant in male
- c) it inherits from father to daughter
- d) A single protein in cascade of several proteins involved in clotting is affected

76. Choose the wrong statement

- a) Mental retardation can be the effect of phenyl pyruvic acid
- b) Thalassemia is a quantitative problem
- c) Sickle cell anemia person produces abnormal Hb
- d) Cystic fibrosis is quantitative

77. Which of the following cannot be detected in developing foetus by amniocentesis /

- a) Klinefelter syndrome
- b) Sex of the foetus
- c) Down syndrome
- d) Jaundice

78. Which mendelian idea is depicted by a cross in which the F1 generation resembles both the parents?

- a) Incomplete dominance
- b) Law of dominance
- c) Inheritance of one gene
- d) Co- dominance

79. If both parents are carriers of thalassemia , which is an autosomal recessive disorder , what are the chance of pregnancy resulting in an affected child?

- a) No chance
- b) 50%
- c) 25%
- d) 100%

80. A human female with Turner's syndrome

- a) Has one additional X chromosome
- b) Exhibits male characters
- c) Is able to produce children with normal husband
- d) Has 45 chromosomes with XO

81. Which of the following cannot be expected on the basis of Mendel's law of dominance

- a) It explains the expression of one of the parental traits in F<sub>1</sub>
- b) It explain expression of both traits in F<sub>2</sub>
- c) It explains the 3:1 ratio in F<sub>2</sub>
- d) It explains the formation of functional enzyme by dominant allele

82. When heterozygous yellow round seed plants and self-fertilized, the frequency of occurrence of RrYY genotype among the offspring's is

- a) 1/16
- b) 3/16
- c) 2/16
- d) 4/16

83. A person homozygous for autosomal loci 'a' and 'b' and heterozygous for gene 'p' shall produce how many types of gametes in respect of these loci

- a) 1 type
- b) 2 types
- c) 3 types
- d) 4 types

84. Experimental proof for chromosome theory of inheritance is given by

- a) Sutton
- b) Sutton and Boveri
- c) T H Morgan
- d) Sturtevent

85. The nuclear structure observed by Henking in 50% of the sperms in the testes of a insect was termed

- a) X-body

- b) Bar body
- c) Polar body
- d) Chromatin

86. First artificial mutation was induced in

- a) Barley
- b) Maize
- c) Drosophila
- d) Neurospora

87. Hemophilic person marries a girl having no history of the disease in her pedigree. What is the chance that a haemophilic child is born to them

- a) 0%
- b) 25%
- c) 50%
- d) 75%

### ANSWER KEY

Q	A	Q	A	Q	A	Q	A
1	C	2	B	3	D	4	C
5	B	6	B	7	B	8	A
9	C	10	A	11	B	12	C
13	C	14	C	15	D	16	B
17	C	18	D	19	B	20	A
21	D	22	D	23	D	24	B
25	B	26	C	27	B	28	B
29	B	30	D	31	B	32	A
33	B	34	C	35	B	36	B
37	C	38	C	39	D	40	D
41	D	42	A	43	D	44	A
45	D	46	D	47	A	48	D
49	B	50	B	51	D	52	B
53	B	54	D	55	B	56	D
57	B	58	D	59	D	60	C
61	C	62	D	63	D	64	B
65	A	66	A	67	D	68	A
69	C	70	C	71	A	72	C
73	C	74	A	75	C	76	C
77	C	78	C	79	B	80	B
81	B	82	A	83	B	84	D
85	C	86	C	87	A		

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