



CET25B4 PRINCIPLES OF INHERITANCE AND VARIATION

Class 12 - Biology

Time Allowed: 1 hour and 30 minutes

Maximum Marks: 75

1. Which of the following statements are true for complementary genes? [1]
 - a. Both the genes interact to produce complementary new trait
 - b. Pair of non-allelic genes
 - c. The F_2 ratio is generally 9 : 7
 - d. The F_2 ratio is generally 9 : 3 : 4

a) (a), (b) and (c) are true b) (b) and (c) are true
c) (c) and (d) are true d) (a) and (b) are true
2. Genotypic and phenotypic ratio in monohybrid cross remains same in case of: [1]
 - a) Dominant and recessive genes
 - b) Pseudoallelic genes
 - c) Intermediate inheritance
 - d) Sex linked genes
3. A heredity disease, which is never passed on from father to son is : [1]
 - a) None of these
 - b) Y-chromosomal linked disease
 - c) X-chromosomal linked disease
 - d) Autosomal linked disease
4. Which Mendelian idea is depicted by a cross in which the F_1 generation resembles both the parents? [1]
 - a) Inheritance of one gene
 - b) Co-dominance
 - c) Law of dominance
 - d) Incomplete dominance
5. Mendel's principle of segregation means that the germ cells always receive: [1]
 - a) One pair of alleles
 - b) One of paired alleles
 - c) Any pair of alleles
 - d) One quarter of genes
6. In our society women are blamed for producing female children as the growth and development of a child occurs inside the mother's womb. This statement is: [1]
 - a) Sometimes correct
 - b) Correct
 - c) Incorrect
 - d) Always correct
7. In a test-cross involving F_1 dihybrid flies, more parental-type offspring were produced than the recombinant-type offspring. This indicates: [1]
 - a) Chromosomes failed to separate during meiosis
 - b) The two genes are located on two different chromosomes
 - c) Both of the characters are controlled by
 - d) The two genes are linked and present on the

more than one gene.

same chromosome

8. A pea plant parent having violet coloured flowers with unknown genotype was crossed with a plant having white coloured flowers, in the progeny 50% of the flowers were violet and 50% were white. The genotypic constitution of the parent having violet coloured flowers was: [1]

 - Heterozygous
 - Hemizygous
 - Homozygous
 - Merozygous

9. The syndrome in humans in which the individual's somatic cells contain three sex chromosomes XXY is called: [1]

 - Down's syndrome
 - Turner's syndrome
 - Klinefelter's syndrome
 - Supermale

10. In our society, female are blamed for producing female children due to: [1]

 - Scientific reasons
 - False notation
 - Production of the same kind of gametes
 - Biological concepts

11. Sickle cell anaemia is caused by the substitution of : [1]

 - Valine by glutamic acid at sixth position of alpha chain of haemoglobin
 - Glutamic acid by valine at sixth position of beta chain of haemoglobin
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12. It is said that Mendel proposed that the factor controlling any character is discrete and independent. His proposition was based on the: [1]

 - results of F_3 generation of a cross.
 - observations that the offspring of a cross made between the plants having two contrasting characters shows only one character without any blending.
 - cross pollination of F_1 generation with recessive parent
 - self pollination of F_1 offsprings

13. Sickle cell anaemia is: [1]

 - X-linked dominant inheritance
 - Antosomal dominant inheritance
 - X-linked recessive inheritance
 - Autosomal recessive inheritance

14. XY chromosome that determines the sex in human beings are: [1]

 - Heterologous
 - Heteromorphic
 - Homomorphic
 - Genologous

15. Klinefelter's syndrome is due to: [1]

 - One X only
 - Two X and one Y
 - One Y only
 - One X and two Y

16. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by. [1]

 - Only daughters
 - Only grandchildren

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- a) Only daughters b) Only grandchildren

- c) Both sons and daughters. d) Only sons
17. Antibodies resemble with which of the following shape? [1]
a) X b) Y
c) O d) Z
18. Occurrence of cell containing multiples of $2n$ genomes in diploid organisms is known as: [1]
a) Amphiploidy b) Endopolyploidy
c) Aneuploidy d) Allopolyploidy
19. Metastasis is associated with: [1]
a) Crown gall tumour b) Malignant tumour
c) Both Benign tumour and Malignant tumour d) Benign tumour
20. The gene which controls many characters is called: [1]
a) Pleiotropic gene b) Codominant gene
c) Polygene d) Multiple gene
21. Double lines in a pedigree analysis show: [1]
a) Normal mating b) Sex unspecified
c) Consanguineous marriage d) Unaffected offspring
22. The phenotypic ratio in the F_2 generation of a dihybrid cross is: [1]
a) 7 : 1 : 1 : 7 b) 9 : 3 : 3 : 1
c) 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1 d) 12 : 3 : 4
23. Genes present in the cytoplasm of eukaryotic cells, are found in: [1]
a) Golgi bodies and smooth endoplasmic reticulum b) Lysosomes and peroxisomes
c) Plastids and inherited via male gamete d) Mitochondria and inherited via egg cytoplasm
24. The chromosomal condition in Turner's syndrome is: [1]
a) 44 autosomes + XXY b) 44 autosomes + XO
c) 44 autosomes + XO d) 21 trisomy with XY
25. Henking in 1891 observed a specific nuclear structure in 50% of sperms. He named this structure: [1]
a) XY body b) Y body
c) X body d) Z body
26. If the offsprings have the blood group O and A, the genotype of parents would be: [1]
a) $I^A i$ and $I^B i$ b) $I^A I^A$ and $I^B i$
c) $I^A I^A$ and $I^A i$ d) $I^A I^A$ and $I^A I^A$
27. A woman with normal vision, but whose father was colour-blind, marries a colour-blind man. Suppose that the fourth child of this couple was a boy. This boy: [1]

- a) May be colour-blind or may be of normal vision
b) Must be colour-blind
c) Will be partially colour-blind since he is heterozygous for the colour-blind mutant allele
d) Must have normal colour vision
28. Human skin colour is an example of: [1]
a) Interallelic interaction
b) Pleiotropy
c) Quantitative interaction
d) Intragenic interaction
29. The inheritance pattern of a gene over generations among humans is studied by the pedigree analysis. Character studied in the pedigree analysis is equivalent to: [1]
a) Maternal trait
b) Quantitative trait
c) Polygenic trait
d) Mendelian trait
30. Haemophilia is a: [1]
a) Deficiency disorder
b) Autosomal sex disorder
c) Y-linked disorder
d) X-linked disorder
31. Which of the following do not have similar sex chromosomes? (Homogametic): [1]
a) Bird male
b) Drosophila female
c) Bird female
d) Human female
32. A woman is married for the second time. Her first husband was ABC type O. Her new husband is type B and their child is type AB. What is the woman's ABO genotype and blood type? [1]
a) $I^A I^O$; Blood type A
b) $I^O I^O$; Blood type O
c) $I^A I^B$; Blood type AB
d) $I^B I^O$; Blood type B
33. When chromosome sets are present in multiple of 'n' the condition is called: [1]
a) Haploidy
b) Euploidy
c) Aneuploidy
d) Diploidy
34. The ultimate biological unit which controls heredity is called: [1]
a) Genome
b) Genotype
c) Gene
d) Chromosome
35. When yellow round heterozygous pea plants are self fertilized, the frequency of occurrence of RrYY genotype among the offsprings is: [1]
a) $\frac{6}{16}$
b) $\frac{9}{16}$
c) $\frac{3}{16}$
d) $\frac{2}{16}$
36. Phenotypic ratio of monohybrid F_2 progeny of an incomplete dominance is: [1]
a) 2 : 1 : 1
b) 3 : 1
c) 1 : 1 : 1 : 1
d) 1 : 2 : 1
37. Which of the following conditions is called monosomic? [1]

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

38. Which of the following is a recessive trait of the garden pea plant? [1]
a) Inflated form of ripe pods
b) Terminal flower position
c) Purple flower colour
d) Green pod colour

39. Mutations that arise suddenly in nature are called: [1]
a) Chromosomal mutations
b) Induced mutations
c) Gene mutations
d) Spontaneous mutations

40. A woman with 47 chromosomes due to three copies of chromosome 21 is characterized by: [1]
a) Super femaleness
b) Down's syndrome
c) Triploidy
d) Turner's syndrome

41. In a dihybrid cross, if you get 9:3:3:1 ratio it denotes that: [1]
a) It is a case of multiple allelism
b) The alleles of two genes are interacting with each other
c) The alleles of two genes are segregating independently.
d) It is a multigenic inheritance

42. Which of the following conditions correctly describes the manner of determining the sex in the given example? [1]
a) XO type of sex determines male sex in grasshopper.
b) XO condition in humans as found in Klinefelter's syndrome determines female sex.
c) Homozygous sex chromosome XX produces male in Drosophila.
d) Homozygous sex chromosome ZZ determines female sex in birds.

43. XO monosomy in female causes: [1]
a) Sickle cell anaemia
b) Klinefelter's syndrome
c) Down's syndrome
d) Turner's syndrome

44. The number of autosomes in a normal human cell is: [1]
a) 46
b) 44
c) 48
d) 45

45. Mating of an organism to a double recessive in order to determine whether it is homozygous or heterozygous character under consideration is called: [1]
a) Dihybrid cross
b) Reciprocal cross
c) Back cross
d) Test cross

46. Linkage is the: [1]
a) Generation of non-parental gene combination
b) Generation of parental gene combination
c) Physical association of two genes present on
d) Physical association of two genes present on

a different chromosome

the same chromosome

47. How many types of genetically different gametes will be produced by a heterozygous plant having the genotype AABbCc? [1]

a) Six
b) Two
c) Nine
d) Four

48. Rr rr progeny : Red (dominant) flowered heterozygous crossed with white flower: [1]

a) 380 → red : 250 → white
b) 450 → red : 250 → white
c) 310 → red : 230 → white
d) 350 → red : 350 → white

49. Female heterogamety is present in: [1]

a) Insects
b) Human beings
c) Birds
d) Cockroach

50. Trisomy of chromosome 21 causes: [1]

a) Turner's syndrome
b) Down's syndrome
c) Klinefelter's syndrome
d) Sickle cell anaemia

51. Three genes R, S and T are located on the same chromosome. If the recombinant percentage between R and S is 20%, R and T is 35% and S and T is 15% respectively, can you predict the correct order of these genes on the chromosome? Which of the following shows the correct sequence of the genes on the chromosome? [1]

a) R-S-T
b) S-T-R
c) S-R-T
d) R-T-S

52. Sickle cell anaemia is [1]

a) Caused by substitution of valine by glutamic acid in the β -globin chain of haemoglobin
b) An autosomal linked dominant trait
c) Characterized by elongated sickle like RBCs with a nucleus
d) Caused by a change in base pair of DNA

53. Choose the set of sex determining chromosomes that indicates the correct sex of the respective organism. [1]

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

54. Moody described the mutation as: [1]

a) Shotgun
b) Saltations
c) Factors
d) Sports

55. In XO type of sex determination: [1]

a. Some sperms bear X-chromosome whereas some do not.
b. The numbers of male and female chromosomes are equal.
c. An egg fertilized by sperms having an X-chromosome becomes female.

- a) Only (b) is correct
b) Only (a) is correct
c) Both (a) and (c) are correct
d) Both (b) and (c) are correct

56. The pairs of chromosomes present in human beings somatic cells are: [1]
a) 45
b) 46
c) 22
d) 23

57. Which one of the following trait of pea plants studied by Mendel is dominant? [1]
a) Green pod colour
b) White pod colour
c) Terminal pod colour
d) Yellow pod colour

58. Occasionally, a single gene may express more than one effect. The phenomenon is called: [1]
a) polygeny
b) pleiotropy
c) multiple allelism
d) mosaicism

59. How many types of gamete will be produced by an individual having genotype of AaBbcc? [1]
a) Two
b) One
c) Four
d) Three

60. Polyploidy can be produced artificially by : [1]
a) Colchicine
b) Line breeding
c) Self pollination
d) Inbreeding

61. Mendelian principles are not applicable in case of: [1]
a) Sex linked alleles
b) Asexually reproducing forms
c) Diploid homozygous forms
d) Sexually in-breeding forms

62. Phenotypic ratio in plant Snapdragon in F_2 is: [1]
a) 2 : 1
b) 3 : 1
c) 1 : 1
d) 1 : 2 : 1

63. A person with unknown blood group under ABO system, has suffered much blood loss in an accident and needs immediate blood transfusion. His one friend who has a valid certificate of his own blood type, offers for blood donation without delay. What would have been the type of blood group of the donor friend? [1]
a) Type B
b) Type AB
c) Type O
d) Type A

64. Which of the following is not a Mendelian disorder? [1]
a) Hemophilia
b) Down's syndrome
c) Thalassemia
d) Colour blindness

65. In human beings, if ovum fertilizes with a sperm carrying X-chromosome the zygote develops into _____. [1]
a) Sterile
b) Female
c) Male
d) No fertilization

66. A normal woman whose father was colourblind is married to a normal man. The sons would be: [1]

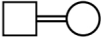
- a) All colourblind
b) 75% colourblind
c) 50% colourblind
d) All normal

67. Which one of the following conditions in humans is correctly matched with its chromosomal abnormality linkage? [1]
a) Down's syndrome - 44 autosomes + XO
b) Colour blindness - Y-linked
c) Erythroblastosis foetalis - X-linked
d) Klinefelter's syndrome - 44 autosomes + XXY

68. A tall plant was grown in nutrient deficient soil and remained dwarf. When it is crossed with dwarf plant then: [1]
a) 50% tall and 50% of dwarf
b) All hybrid plants are tall
c) All hybrid plants are dwarf
d) 75% tall and 25% dwarf

69. When a gene pair in an organism contains two identical alleles, the organism is considered to be: [1]
a) Homozygous
b) Heterozygous
c) Genotypic
d) Phenotypic

70. Gene for colourblindness is located on : [1]
a) Y chromosome
b) 21st chromosome
c) X chromosome
d) 13th chromosome

71. In a pedigree analysis,  represents: [1]
a) Affected individuals
b) Non-identical twins
c) Consanguineous mating
d) Unrelated mating

72. Cross between unrelated group of organisms is called: [1]
a) Test cross
b) Heterosis
c) Back cross
d) Hybrid

73. A somatic cell in human male contains: [1]
a) Genes only on sex chromosomes
b) Two genes for every sex-linked character
c) Only one sex-linked gene for each character
d) No gene in sex chromosome

74. Allelism refers to: [1]
a) Multiple genes controlling a character
b) Genic interactions controlling a character
c) Alternative forms of a gene at a given locus
d) Expression of many characters by a single gene

75. Turner's Syndrome is caused due to: [1]
a) An additional copy of X chromosome
b) Absence of both the X chromosome
c) Absence of one of the X chromosome
d) An additional copy of Y chromosome