



Classical Thinking



1.0 Introduction

- The phenomenon of 'like begets like' is due to
(A) genetics (B) heredity
(C) germplasm (D) variation
- Transmission of characters from one generation to the next or from parents to offsprings is called
(A) heredity (B) variation
(C) recombination (D) mutation
- Variation is
(A) differences between parents and offsprings.
(B) differences between individuals of same species.
(C) differences among the offsprings of the same parents.
(D) all of the above.
- The term "genetics" was coined by
(A) Morgan
(B) William Bateson
(C) Johannsen
(D) Karl Correns
- The greek word which means 'to grow into' is
(A) genetics (B) genesis
(C) inheritance (D) factor
- The first scientific explanation regarding inheritance was given by
(A) William Bateson
(B) Gregor Johann Mendel
(C) Griffith
(D) Johannsen
- Who is known as "Father of Genetics"?
(A) Theophrastus (B) Stephen Hales
(C) Mendel (D) Aristotle



1.1 Mendelian inheritance

- Organisms produced by asexual reproduction are called
(A) clones
(B) offsprings
(C) factors
(D) both (A) and (B)
- Organisms produced by sexual reproduction are called
(A) offsprings (B) clones
(C) characters (D) genes

- Offsprings are
(A) exactly identical to either of their parents.
(B) not exactly identical to either of their parents.
(C) show intermediate characters inherited from both the parents.
(D) both (B) and (C)
- The term "factor" for gene was coined by
(A) William Bateson
(B) Johann Mendel
(C) Johannsen
(D) F. Griffith
- Gregor Mendel was born in
(A) U.K (B) Austria
(C) Russia (D) Czechoslovakia
- Mendel was a
(A) physiologist (B) mathematician
(C) cytologist (D) taxonomist
- The first scientific study leading to the formulation of laws of inheritance was carried out by
(A) Darwin (B) Hugo De Vries
(C) Lemarck (D) Mendel
- Under which title was Mendel's work published in Natural History Society of Brunn?
(A) Mendel's Laws of Inheritance
(B) Experiments in Plant Hybridization
(C) Experiment on Heredity and Variation
(D) Origin of Species
- Mendel's laws were first published in the year
(A) 1875 (B) 1890
(C) 1928 (D) 1866
- The year 1900 A.D. is highly significant for geneticists due to
(A) chromosome theory of heredity
(B) discovery of genes
(C) rediscovery of Mendelism
(D) principle of linkage
- The Mendelian principles of inheritance were rediscovered by
(A) Sutton and Boveri
(B) Hugo de Vries, Tschermak and Correns
(C) Lederberg and Tatum
(D) Morgan

19. Mendel's work was rediscovered by three biologists from which of the following countries?
(A) Holland, France and England
(B) Holland, England and Austria
(C) Germany, France and England
(D) Austria, Holland and Germany
20. Mendel selected pea plant because of
(A) its short life span.
(B) it produced many seeds and large flowers.
(C) many contrasting characters.
(D) all of these
21. The botanical name of garden pea is
(A) *Pisum sativum*
(B) *Lathyrus odoratus*
(C) *Mangifera indica*
(D) *Solanum tuberosum*
22. Which of the following is a dominant character in pea?
(A) Wrinkled seeds
(B) Inflated pod
(C) Terminal flower
(D) Dwarf plant
23. Which of the following character was not considered by Mendel?
(A) Seed coat colour
(B) Wrinkled or round leaves
(C) Tallness or dwarfness
(D) Position of flower
24. An inherited character and its detectable variant is called
(A) allele
(B) trait
(C) gene
(D) both (A) and (B)
25. Which one of the following best describes a gene?
(A) A triplet of nucleotide bases.
(B) A specific length of DNA responsible for the inheritance and expression of the character.
(C) A specific length of single stranded RNA.
(D) Both (B) and (C)
26. Mendel's "factors" are in fact
(A) units (B) chromosomes
(C) genes (D) none of these
27. Who coined the term 'gene' for 'factor'?
(A) Mendel (B) Morgan
(C) Johannsen (D) Punnett
28. Alleles or allelomorphs occupy
(A) same position on homologous chromosomes.
(B) same position on heterozygous chromosomes.
(C) different position on homologous chromosomes.
(D) different position on heterozygous chromosomes.
29. Who proposed the term 'Allelomorph'?
(A) Hugo De Vries (B) Morgan
(C) Tschermak (D) Bateson
30. Dominant allele means
(A) an allele whose effect is masked by another allele.
(B) an allele that prevents the expression of the other allele.
(C) an allele without any effect.
(D) an allele which cannot express in presence of other.
31. The external appearance of an individual for any trait is called as
(A) phenotype (B) karyotype
(C) morphology (D) physique
32. Genotype is
(A) genetic constitution of an organism.
(B) genetic constitution of somatic cells.
(C) genetic constitution of plastids.
(D) genetic constitution of germ cells.
33. Homozygous individuals
(A) breed true to the trait.
(B) does not breed true to the trait.
(C) produce only one type of gamete.
(D) both (A) and (C)
34. Which of the following term indicates a pair of dissimilar alleles?
(A) Homozygous
(B) Heterozygous
(C) Homologous
(D) All of these
35. A cross between two pure individuals, differing in atleast one set of characters, is called
(A) monohybrid (B) polyploid
(C) mutant (D) variant

36. F_1 generation means
(A) first flowering generation
(B) first fertile generation
(C) first filial generation
(D) first seed generation
37. Filial means
(A) offsprings produced in sexual reproduction.
(B) offsprings produced in asexual reproduction.
(C) offsprings produced in vegetative reproduction.
(D) both (B) and (C)
38. F_2 generation is produced by
(A) crossing F_1 progeny with one of the parents.
(B) selfing the heterozygous progeny.
(C) selfing the parents.
(D) a cross between recessive parents.
39. In genetics, the use of checkerboard was done by
(A) Mendel (B) Correns
(C) Punnet (D) Darwin
40. Mendel, in his experiments
(A) maintained qualitative records.
(B) maintained quantitative records.
(C) conducted ample crosses and reciprocal crosses.
(D) all of the above
41. To eliminate chance factor, Mendel performed
(A) monohybrid cross
(B) dihybrid cross
(C) reciprocal cross
(D) trihybrid cross
42. Mendel always started his experiment (Monohybrid and Dihybrid cross) with
(A) any pea plant
(B) a heterozygous plant
(C) a pure line plant
(D) a fresh new plant
43. Mendel carried out artificial cross by
(A) emasculation of selected female parent plant
(B) emasculation of selected male parent plant
(C) dusting of pollen grains from selected male plant over selected female plant
(D) both (A) and (C)
44. Emasculation means
(A) removal of stamens before anthesis.
(B) removal of stigma before anthesis.
(C) removal of petals before anthesis.
(D) removal of sepals before anthesis.
45. In pea flower, how many stamens are free and how many are fused?
(A) 1, 9 (B) 2, 8
(C) 5, 5 (D) 4, 6
46. F_3 generation was obtained by
(A) selfing F_1 hybrids
(B) selfing F_2 hybrids
(C) crossing F_1 with either parent
(D) none of these
47. What result did Mendel obtained after monohybrid cross between tall and dwarf pea plant?
(A) All new plants were dwarf.
(B) All new plants were tall.
(C) 50% plants were dwarf and 50% plants were tall.
(D) 75% plants were tall and 25% plants were dwarf.
48. When Mendel allowed natural selfing of F_1 hybrids during monohybrid cross between pure tall and pure dwarf pea plant, he found
(A) all plants were tall.
(B) all plants were dwarf.
(C) dwarfness reappeared in some plants.
(D) tallness reappeared in some plants.
49. During monohybrid cross experiments, Mendel performed reciprocal cross by selecting
(A) tall plant as male and dwarf plant as female.
(B) tall plant as female and dwarf plant as male.
(C) both male and female plant as tall.
(D) both male and female plant as dwarf.
50. After performing reciprocal cross between tall and dwarf plants, the ratio of tall and dwarf plants obtained was
(A) 1:2 (B) 3:1
(C) 1:3 (D) 2:1
51. Mendel grouped all contrasting characteristics in _____ pairs.
(A) 15 (B) 14
(C) 7 (D) 6

52. The conclusion drawn by Mendel based on monohybrid cross was
(A) each factor exist in two contrasting or alternative forms.
(B) one of the forms is dominant and other is recessive.
(C) inheritance of each character is controlled by a pair of factors.
(D) all of the above
53. From the reappearance of recessive trait in F_2 generation, Mendel concluded that
(A) factors do not mix with each other in F_1 generation.
(B) factors remain together in F_1 generation.
(C) factor mix with each other in F_1 generation.
(D) both (A) and (B)
54. During gamete formation,
(A) diploid gametes are formed.
(B) each gamete receives only one factor.
(C) factors do not segregate.
(D) all offsprings show recessive characters.
55. The crossing of a homozygous tall pea plant and homozygous dwarf pea plant would yield plants in the ratio of
(A) 2 tall : 2 dwarf.
(B) all homozygous dwarf.
(C) all heterozygous tall.
(D) one homozygous tall : one homozygous dwarf : two heterozygous tall.
56. Mendel crossed a pure white flowered pea plant with pure red flowered plant. The first generation of hybrids from the cross should show
(A) 75% red flowered and 25% white flowered plants.
(B) 50% white flowered and 50% red flowered plants.
(C) all red flowered plants.
(D) all white flowered plants.
57. In monohybrid cross between pure tall and pure dwarf pea plant, how many types of genotypes are found in F_2 generation ?
(A) 4 (B) 3
(C) 8 (D) 9
58. Out of the four progenies obtained in F_2 generation by crossing pure tall and pure dwarf, how many of them will receive only recessive trait from both parents?
(A) all four (B) one
(C) two (D) three
59. The monohybrid ratio is defined as
(A) phenotypic ratio obtained in F_2 generation of monohybrid cross.
(B) phenotypic ratio obtained in F_1 generation of monohybrid cross.
(C) genotypic ratio obtained in F_2 generation of monohybrid cross.
(D) genotypic ratio obtained in F_1 generation of monohybrid cross.
60. Which of the following is phenotypic ratio of Mendel's monohybrid cross ?
(A) 1:2:1 (B) 3:1
(C) 1:1:2 (D) 1:3
61. The law of dominance is illustrated in the garden pea by
(A) heterozygous tall \times heterozygous tall
(B) homozygous tall \times homozygous tall
(C) pure short \times pure dwarf
(D) homozygous tall \times pure dwarf
62. Which of the following Mendel's laws has not been proved to be true in all cases?
(A) Law of segregation
(B) Mendel's second law of inheritance
(C) Law of dominance
(D) Law of purity of gametes
63. The second law of inheritance proposed by Mendel deals with
(A) dominance
(B) independent assortment
(C) segregation
(D) epistasis
64. Reappearance of recessive trait in F_2 generation is due to
(A) Law of independent assortment
(B) Law of dominance
(C) Law of codominance
(D) Law of purity of gametes
65. Which of the Mendel's laws will always prove to be universally true in all cases?
(A) All three laws
(B) Only the 2nd law
(C) 2nd and 3rd laws
(D) 1st and 2nd laws
66. Mendel formulated the law of dominance and law of purity of gametes on the basis of
(A) test cross
(B) back cross
(C) monohybrid cross
(D) dihybrid cross

67. A cross between two pure individuals differing in two sets of characters is called
 (A) dihybrid cross
 (B) monohybrid cross
 (C) trihybrid cross
 (D) reciprocal cross
68. The phenotype of plant with genotype YyRr must be
 (A) Yellow wrinkled (B) Green round
 (C) Yellow round (D) green wrinkled
69. Dihybrid ratio is defined as
 (A) phenotypic ratio obtained in F_2 generation of dihybrid cross.
 (B) phenotypic ratio obtained in F_1 generation of dihybrid cross.
 (C) genotypic ratio obtained in F_2 generation of dihybrid cross.
 (D) genotypic ratio obtained in F_1 generation of dihybrid cross.
70. While performing dihybrid cross, Mendel
 (A) selected a variety of pea plant having yellow and round seed as female parent and another variety having green and wrinkled seeds as a male parent.
 (B) obtained pure lines by selfing
 (C) performed artificial cross by emasculation
 (D) all of the above
71. Out of the four phenotypes obtained in F_2 generation of dihybrid cross between yellow round and green wrinkled seeds of pea plant,
 (A) two were parental and two were new combination
 (B) all were parental combination
 (C) all were with recessive trait
 (D) all were new combination
72. The statement – “Probability of two independent events occurring simultaneously is the product of their individual probabilities” is
 (A) law of dominance
 (B) principle of probability
 (C) law of segregation
 (D) law of new combinations
73. $(3 : 1) \times (3 : 1) = 9 : 3 : 3 : 1$
 This signifies
 (A) trihybrid ratio
 (B) two monohybrid ratio
 (C) dihybrid ratio is a product of two monohybrid ratios
 (D) none of the above
74. Mendel’s pattern of inheritance systematically showed the progeny in
 (A) checker board (B) square board
 (C) cross board (D) all of these
75. The conclusions made by Mendel based on dihybrid cross was
 (A) when a dihybrid or polyhybrid forms gametes, each gamete receives only one allele from each pair
 (B) the assortment of alleles of different traits is totally independent of their parental combination
 (C) both (A) and (B)
 (D) none of the above
76. When Mendel crossed pea plants with yellow round seed and green wrinkled seed, the seeds obtained in F_1 hybrid were,
 (A) yellow wrinkled (B) yellow round
 (C) green wrinkled (D) green round
77. The phenotypic ratio of F_2 progeny in a dihybrid cross is
 (A) 9 : 3 : 3 : 1 : 1
 (B) 9 : 3 : 3 : 1
 (C) 9 : 1 : 3 : 3 : 1
 (D) 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1
78. The genotypic ratio obtained in a Mendelian dihybrid cross is
 (A) 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1
 (B) 9 : 3 : 3 : 1
 (C) 1 : 4 : 4 : 1 : 2 : 2 : 1 : 1
 (D) 9 : 7
79. New character combinations appear in F_2 generation of a dihybrid cross mainly because of
 (A) dominance
 (B) recessiveness
 (C) principle of unit character
 (D) independent assortment
80. Law of independent assortment can be explained by
 (A) monohybrid cross and monohybrid ratio
 (B) dihybrid cross and dihybrid ratio
 (C) trihybrid cross and trihybrid ratio
 (D) all of the above
81. _____ occurs due to crossing over taking place during meiosis.
 (A) Linkage (B) Recombination
 (C) Segregation (D) Mutation

82. Law of independent assortment is applicable for the traits which
 (A) are located on different chromosomes.
 (B) are located on same chromosome.
 (C) are located on homologous.
 (D) both (B) and (C)
83. The three important laws of heredity proposed by Mendel relate to
 (A) gene linkage, character segregation and independent assortment.
 (B) gene linkage, dominance and segregation.
 (C) segregation, independent assortment and dominance–recessiveness.
 (D) segregation, independent assortment and codominance.
84. Mendel did not propose law of
 (A) segregation
 (B) dominance
 (C) incomplete dominance
 (D) independent assortment
85. The reason behind the success of Mendel was
 (A) choice of material.
 (B) use of pure line.
 (C) maintenance of qualitative and quantitative record.
 (D) all of the above
86. A test cross
 (A) is used to investigate whether the dominant expression is homozygous or heterozygous.
 (B) involves mating of F_1 hybrid with homozygous recessive parent.
 (C) both (A) and (B)
 (D) none of these
87. In F_2 hybrid, to check the tall plant is homozygous or heterozygous, which cross is performed?
 (A) test cross (B) back cross
 (C) monohybrid cross (D) both (A) and (B)
88. Which of the following ratio refers to back cross?
 (A) $AA \times Aa$ (B) $Aa \times Aa$
 (C) $Aa \times AA$ (D) $AA \times AA$
89. A cross between individual with unknown genotype for a particular trait with a recessive plant for that trait is called
 (A) back cross (B) test cross
 (C) monohybrid cross (D) dihybrid cross



1.2 Deviations from Mendelian ratios

90. Interaction between two alleles which are present on the same gene locus of two homologous chromosomes is called
 (A) intragenic interaction
 (B) interallelic interaction
 (C) intergenic interaction
 (D) both (A) and (B)
91. Interaction between the alleles of different genes on the same or different chromosome is called
 (A) intergenic
 (B) nonallelic
 (C) intragenic
 (D) both (A) and (B)
92. RR (red) flowered plant of *Mirabilis* is crossed with rr (white) flowered plant of *Mirabilis*. All the Rr offsprings are pink. This is an indication that the R gene is
 (A) codominant
 (B) recessive
 (C) incompletely dominant
 (D) linked
93. In incomplete dominance, one could get 1 : 2 : 1 ratio in
 (A) test cross (B) F_2 generation
 (C) F_1 generation (D) R cross
94. Co-dominance differs from incomplete dominance as in co-dominance
 (A) the hybrid is intermediate
 (B) both the genes are expressed equally
 (C) dominant gene is expressed in F_1 generation
 (D) genotypic ratio is 1 : 1
95. Multiple alleles of a gene always occupy
 (A) the same locus on a chromosome
 (B) the same position on different chromosome
 (C) different loci on a chromosome
 (D) different loci on different chromosomes
96. In *Drosophila*, the genotype of normal wings
 (A) vg^{ni} (B) Vg^+
 (C) vg^{no} (D) vg
97. ABO blood grouping is based on
 (A) codominance
 (B) incomplete dominance
 (C) epistasis
 (D) multiple allelism

98. Blood grouping in humans is controlled by
 (A) 4 alleles in which A is dominant.
 (B) 3 alleles in which AB is codominant.
 (C) 3 alleles in which none is dominant.
 (D) 3 alleles in which A is dominant.
99. In pleiotropic inheritance, different traits are controlled by
 (A) many genes (B) one or two genes
 (C) single gene (D) mutation
100. Which of the following is an example of pleiotropy?
 (A) Haemophilia
 (B) Thalassemia
 (C) Sickle cell anaemia
 (D) Colour blindness
101. The genotype of a carrier carrying a gene for sickle-cell anaemia is
 (A) Hb^s (B) Hb^A/Hb^s
 (C) Hb^A (D) Hb^o
102. In which disease, does the RBC of a person becomes half moon-shaped?
 (A) haemophilia
 (B) sickle – cell anaemia
 (C) thalassaemia
 (D) leukemia
103. A marriage between two carriers of sickle – cell anaemic gene will result into
 (A) 1 normal and 2 carriers
 (B) 1 sickle-cell anaemic
 (C) 2 normal and 2 sickle – cell anaemic
 (D) both (A) and (B)
104. When single character is controlled by two or more genes is called
 (A) pleiotropy
 (B) multiple allelism
 (C) polygenic inheritance
 (D) co-dominance
105. The additive or cumulative effect is shown by
 (A) Pleiotropic gene
 (B) Monogene
 (C) Polygenes
 (D) Complementary genes
106. Who discovered polygenic inheritance?
 (A) H. Nilsson -Ehle (B) Davenport
 (C) Johannsen (D) Bateson
107. The phenotypic ratio of red (AABB) and white (aabb) kernel in F_2 generation showing polygenic inheritance is
 (A) 1:2:1 (B) 1:4:6:4:1
 (C) 1:6:4:4:1 (D) 1:6:15:20:15:6:1
108. When red wheat kernel is crossed with white wheat kernel, the probability of getting red darkest plant is
 (A) 1/16 (B) 4/16
 (C) 6/16 (D) 2/16
109. The phenotypic ratio of polygenes representing skin colour in humans is
 (A) 1 : 4 : 6 : 4 : 1
 (B) 1 : 2 : 1
 (C) 1 : 6 : 15 : 20 : 15 : 6 : 1
 (D) 1 : 3 : 1
110. Who studied the inheritance of skin colour in negro and white population in USA ?
 (A) Hugo De Vries
 (B) Karl Correns
 (C) Davenport and Davenport
 (D) Mendel
111. Skin colour is controlled by
 (A) 2 pairs of genes
 (B) single gene
 (C) 3 pairs of genes
 (D) 2 pairs of genes with an intragene
112. When a negro marries white, how many phenotypes are obtained?
 (A) 7 (B) 10
 (C) 16 (D) 8
113. AaBbCc is the genotype of
 (A) fair
 (B) mulatto
 (C) pure black (negro)
 (D) albino



Miscellaneous

114. The science dealing with heredity and variation is known as
 (A) cytology (B) cytohistology
 (C) embryology (D) genetics
115. The peculiar characteristic of pea flowers is
 (A) papilionaceous corolla
 (B) blue coloured petals
 (C) round petals
 (D) long petals
116. To avoid the birth of child with fatal sickle-cell anaemia,
 (A) marriage between two homozygotes is discouraged
 (B) marriage between two heterozygotes is discouraged
 (C) both (A) and (B)
 (D) none of the above