

PRINCIPLES OF INHERITANCE AND VARIATION

Exercise



Biology

DPP-9

- The degree by which progeny differ from their parents is known as
 - Genetics
 - Variation
 - Heredity
 - Inheritance
- Sahiwal cows of Punjab are developed by
 - Artificial selection
 - Domestication
 - Both (a) and (b)
 - Mutation
- Which of the following genotype represents heterozygous condition?
 - TT
 - tt
 - Tt
 - RR
- How many true breeding pea plant varieties were selected by Mendel?
 - 14
 - 7
 - 21
 - 2
- Mendel selected *Pisum sativum* for hybridization experiments because of
 - Clear contrasting characters and short life span
 - Long life span and non-fertile hybrids
 - Presence of unisexual flowers
 - Infertile hybrids and production of large number of seeds by each plant
- Mark the odd one (w.r.t. dominant trait in garden pea)
 - Yellow pod
 - Inflated pod
 - Axial flower
 - Yellow seed
- Transmission of genetic characters from parents to offspring is
 - Variation
 - Heredity
 - Blending
 - Somatoplasm
- Who coined the term 'allele'?
 - Saunders
 - Bateson
 - Johannsen
 - Mendel
- Which of the following trait of garden pea is present on 7th chromosome?
 - Pod shape
 - Pod color
 - Seed shape
 - Stem height
- All traits can express themselves in heterozygous condition, except
 - Tall
 - Violet
 - Axial
 - Wrinkled seed
- The phenotype of F₁ hybrid resembles either of the two parents in
 - Dominance
 - Incomplete dominance
 - Co-dominance
 - Intermediate inheritance
- Mendel proposed law of dominance and law of segregation based on his observations on
 - Monohybrid crosses
 - Dihybrid crosses
 - Test crosses
 - Out crosses
- Which of the following phenotypic ratio was found by Mendel in F₂ generation of a dihybrid cross?
 - 3:1
 - 1:2:1:2:4:2:1:2:1
 - 9:3:3:1
 - 12:4
- Both phenotypic and genotypic ratio of F₂ are same in
 - Co-dominance
 - Incomplete dominance
 - Out cross
 - More than one option is correct
- The ability of a gene to have multiple phenotypic effects is known as
 - Pleiotropy
 - Co-dominance

1.(b), 2.(c), 3.(c), 4.(a), 5.(a), 6.(a), 7.(b), 8.(b), 9.(c), 10.(d), 11.(a), 12.(a), 13.(c), 14.(d), 15.(a), 16.(c), 17.(c)

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- c. Incomplete dominance
d. Complete dominance
16. How many types of gametes can be produced by a diploid organism, if it is heterozygous for 3 loci?
a. 6
b. 4
c. 8
d. 3
17. What will be genotypic ratio in the F_2 generation of a monohybrid out cross?
a. 9:3:3:1
b. 1:2:1
c. 1:1
d. 3:1

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18. A cross between F₁ hybrid and its homozygous recessive parent is called
 - a. Out cross
 - b. Test cross
 - c. Monohybrid cross
 - d. Dihybrid cross
19. Select the correct option w.r.t. law of independent assortment
 - a. It can be explained by using monohybrid cross
 - b. Inheritance of one character is dependent on another character
 - c. This law is not applicable universally
 - d. It was proposed by Bateson
20. Find the incorrect match
 - a. Gamete : Pure for a trait
 - b. Co-dominance : Flower color in Snapdragon
 - c. Recessive gene : Expressed in homozygous
 - d. Incomplete dominance : Carl Correns
21. Select the odd one out w.r.t. non-allelic gene interactions
 - a. Epistasis
 - b. Duplicate genes
 - c. Incomplete dominance
 - d. Complementary genes
22. Fruit color in *Cucurbita pepo* is an example of
 - a. Complementary genes
 - b. Duplicate genes
 - c. Dominant epistasis
 - d. Polymeric genes
23. Complementary genes were demonstrated by Bateson and Punnett in
 - a. *Capsella*
 - b. *Lathyrus odoratus*
 - c. *Antirrhinum*
 - d. *Mirabilis*
24. If dominant alleles of two gene loci produce the same phenotype whether inherit separately or together, it will be
 - a. Recessive epistasis
 - b. Dominant epistasis
 - c. Duplicate genes interaction
 - d. Inhibitory genes interaction
25. A gene which hides the action of another gene is termed as
 - a. Co-dominant gene
 - b. Epistasis gene
 - c. Hypostatic gene
 - d. Lethal gene
26. In polymeric gene action, the modified dihybrid phenotypic ratio in F₂ generation is
 - a. 9:3:3:1
 - b. 13:3
 - c. 9:6:1
 - d. 12:3:4
27. Which of the following genotype of sweet pea plant is related with the production of purple colored flower?
 - a. CcPp
 - b. CCpp
 - c. ccPP
 - d. Ccpp
28. Select the odd one out w.r.t. polygenic inheritance
 - a. Bell-shaped curve is obtained
 - b. Also called quantitative inheritance
 - c. Recessive alleles show cumulative effect
 - d. Intermediate phenotypes are more frequent
29. Select the correct match (w.r.t. dihybrid phenotypic ratio is F₂ generation)
 - a. Recessive epistasis : 12:3:1
 - b. Dominant epistasis : 9:3:4
 - c. Collaborative gene : 9:3:3:1
 - d. Duplicate genes : 9:7
30. Skin color in man is controlled by
 - a. Three pairs of polygenes
 - b. Duplicate genes
 - c. Six pairs of polygenes
 - d. Supplementary genes
31. Select the odd one w.r.t. chromosomal theory of inheritance
 - a. It was proposed by Sutton and Boveri
 - b. Behavior of chromosomes in parallel of genes
 - c. Chromosomes and genes occur in pairs in diploid and haploid cells respectively
 - d. The paired condition of both chromosomes as well as Meridellian factors is restored during fertilization
32. The term gene for Mendelian factor was coined by

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- a. Sutton and Boveri
b. Morgan
c. Bateson
d. Johannsen
33. Morgan used *Drosophila* as experimental material because
a. It cannot be reared and bred under lab conditions
b. A single mating produces very few offsprings
c. It has high number of morphologically similar chromosomes
d. It has a short life span
34. Who carried out several dihybrid crosses in *Drosophila* to study genes that were sex-linked?
a. Morgan
b. Sutton
c. Bateson
d. Punnet
35. Female *Drosophila* is
a. Smaller in size than male
b. Larger in size than male
c. Larger in size with shorter life span than male
d. Having heteromorphic sex chromosomes
36. Find the odd one out w.r.t. complete linkage
a. 100% parental combinations in F_2 generation
b. F_2 phenotypic ratio is 3:1 in dihybrid cross
c. Dihybrid test cross ratio is 1:1 in F_2 generation
d. Linked genes tend to separate frequently
37. A condition where an individual heterozygous for two pairs of linked genes (AaBb) possesses the two dominant genes on one homologous chromosome pair and two recessive on the other, it is said to be
a. Cis-arrangement
b. Trans-arrangement
c. Partly cis partly trans
d. More than one option is correct
38. How many linkage groups are present in human male?
a. 24
b. 23
c. 46
d. 22
39. What is the recombination percentage between gene y and w in *Drosophila*?
a. 1.3%
b. 98.7%
c. 62.8%
d. 37.2%
40. Find the incorrect statement w.r.t. chromosomal mapping
a. Crossing over is important in locating genes on chromosome
b. Recombination frequency depends upon the distance between the genes
c. Recombination frequency is inversely proportional to distance between genes
d. The sequences and the relative distances between various genes is graphically represented in terms of recombination frequencies
41. Individuals having homomorphic sex-chromosomes produce
a. One type of gametes
b. Two type of gametes
c. No gametes
d. Only on gamete in complete life
42. Holandric genes are present on
a. X-chromosomes
b. Y-chromosomes
c. Sex-chromosomes as well as autosomes
d. Autosomes
43. Mark the incorrect pair (w.r.t. sex determination)
a. ZW-ZZ type - Fishes
b. ZO-ZZ type - Birds
c. XX-XO type - *Dioscorea*
d. XX-YY type - *Melandrium*
44. 50% sperms are devoid of sex-chromosomes in
a. *Melandrium*
b. Moth
c. Grasshopper
d. Bee
45. In the XX-XO type of sex determination
a. Females produce only one type of eggs
b. Females have only one X-chromosomes
c. Males have two X-chromosomes
d. Males are homogametic
46. Select the odd one out w.r.t. genic balance theory of sex-determination in *Drosophila*
a. Y-chromosome plays no role in sex-determination

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- b. Given by C.B. Bridges
c. If X/A ratio is one, superfemales are produced
d. If X/A ratio is less than 0.5, supermales are produced
47. Environmental mechanism of sex-determination of sex-determination is seen in
a. *Bonnellia* c. Grasshopper
b. *Crepidula* d. More than one option is correct
48. Select the odd one out w.r.t. harmophilia
a. X-linked dominant disorder c. Criss-cross inheritance
b. Bleeder's disease d. X-linked recessive disorder
49. Select the correct match
a. Sex-limited trait - Color blindness
b. Sex-limited trait - Express in both sexes
c. Sex-influenced trait - More frequent in one sex than in the other
d. Sex-influenced trait - Porcupine skin
50. All are sex limited traits, except
a. Beard in man c. Antlers in male deer
b. Porcupine skin d. Brilliant plumage in peacock
51. Mark the odd one (w.r.t. genomic mutation)
a. Hypoploidy c. Duplication
b. Tetrasomy d. Allopolyploidy
52. Find the incorrect match
a. Somatic mutation - No evolutionary
b. Germinal mutation - Gametic mutation
c. Frame shift mutation - Gibberish mutation
d. Chromosomal mutation - Transversion
53. Substitution of a purine with another type of purine is called
a. Transversion c. Inversion
b. Transition d. Translocation
54. Inversion without involving the centromere is called
a. Paracentric c. Pericentric
b. Monosomy d. Tautomerization
55. Aneuploidy which results in loss of a complete homologous pair of chromosome is
a. Trisomy c. Nullisomy
b. Tetrasomy d. Euploidy
56. Which of the following chemical is a base analogue?
a. 5-bromouracil c. Nitrous acid
b. Acridines d. Hypoxanthine
57. Cytoplasmic male sterility in maize is due to defective
a. Mitochondria c. Golgi body
b. Lysosome d. Leucoplast
58. Select the incorrect statement w.r.t. pedigree analysis
a. Solid symbol shows the unaffected individual
b. It is useful for genetic counselors
c. Proband is the person from which case history starts
d. It is an analysis of traits in a several generations of a family
59. Which of the following abnormalities is due to X-linked recessive mutation?
a. Cystic fibrosis c. Klinefelter's syndrome
b. Thalassaemia d. Lesch-Nyhan syndrome
60. Find odd one (w.r.t. dominant traits in humans)
a. Blue eyes
b. Brown eyes
c. Free ear lobes
d. Myotonic dystrophy