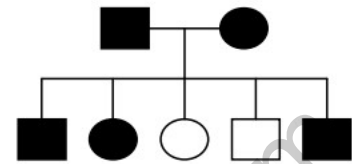


DPP(MCQ) SEM-I ICSE Class X

Biology – Genetics

The first three questions are based on the pedigree to the right:



- The characteristic indicated by the blackened figures is probably:
 - Dominant.
 - Recessive.
 - Non-dominant.
 - Sex-linked recessive.
- What are the genotypes of the parents?
 - Both are homozygous dominant.
 - Both are heterozygous dominant.
 - Both are homozygous recessive.
 - The male is homozygous dominant; the female is homozygous recessive.
- If one parent has type A blood and the other parent has type B blood, what blood type will the offspring denoted by the white square and circle have?
 - Type A.
 - Type B.
 - Type AB.
 - Type O.
- Mitotic cell division results in two cells that have:
 - n chromosomes and are genetically identical.
 - n chromosomes and are genetically different.
 - $2n$ chromosomes and are genetically identical.
 - $2n$ chromosomes and are genetically different.
- In tobacco, if the diploid number of chromosomes is 48, how many chromosomes will be found in a pollen grain?
 - 96.
 - 48.
 - 24.
 - 12.
- The four cells produced in meiosis will have a:
 - $2n$ number of chromosomes and will differ genetically from each other.
 - $2n$ number of chromosomes and will be genetically identical to each other.
 - n number of chromosomes and will be genetically identical to each other.
 - n number of chromosomes and will differ genetically from each other.

7. In the F_1 generation of a monohybrid cross, the phenotypic ratio would be:
- 3:1
 - 1:2:1
 - 2:1:1
 - 1:1:2
8. Hemophilia is a sex-linked recessive trait in humans. If a father and a son are both hemophiliacs, but the mother is normal, her genotype must be:
- X^hX^h
 - X^HX^h
 - X^HX^H
 - X^hY
9. Mitosis involves separation of only sister chromatids while meiosis involves?
- Also separation of only sister chromatids.
 - Separation of only homologous chromosomes.
 - Separation of homologous chromosomes as well as sister chromatids.
 - Separation of sister chromatids twice.
10. The cytoplasm of an animal cell is divided by means of:
- A cleavage furrow.
 - A cell plate.
 - A cell membrane formed within the cytoplasm.
 - Mitosis.
11. The step of mitosis in which chromosomes line up along the equatorial plane of the cell is called:
- Prophase.
 - Metaphase.
 - Anaphase.
 - Telophase.
12. An example of alleles is:
- AB and Tt.
 - TT and Tt.
 - T and t.
 - X and Y.
13. An example of a genotype is:
- A tall pea plant.
 - R and r.
 - TtHH.
 - Hemophiliac.
14. Which of the following gives information about the phenotype but not the genotype?
- X^HY .
 - Hemophiliac man.
 - Tall pea plant.
 - Female carrier for colour-blindness.

15. Which blood type would not be possible for children of a type AB mother and a type A father?
- O.
 - A.
 - B.
 - AB.
16. Long radishes crossed with round radishes result in all oval radishes. This type of inheritance is:
- Multiple alleles.
 - Complete dominance.
 - Co-dominance.
 - Incomplete dominance.
17. If two white sheep produce a black offspring, the parent's genotypes for colour must be:
- Heterozygous.
 - Homozygous white.
 - Homozygous black.
 - Not enough information was given.
18. An extra finger in humans is rare but is due to a dominant gene. When one parent is normal and the other parent has an extra finger but is heterozygous for the trait, what is the probability that the first child will be normal?
- 0%.
 - 25%.
 - 50%.
 - 75%.
19. In drosophila (fruit flies), eye colour is sex-linked and red eye colour is dominant to white eye colour. Which of the following are not possible in a cross between a red-eyed male and a heterozygous female?
- Red-eyed male.
 - White-eyed male.
 - Carrier female.
 - Homozygous white-eyed female.
20. Which statement concerning a pair of alleles for a gene controlling a single characteristic in humans is true?
- Both genes come from the father.
 - Both genes come from the mother.
 - One gene comes from the mother and one gene comes from the father.
 - The genes come randomly in pairs from either the mother or father.
21. Which of the following factors could lead to variations in the offspring of asexually reproducing organisms?
- Crossing over.
 - Fertilization.
 - Mutations.
 - Independent assortment.

22. Genetic traits of seeds are noted as follows:

- L = long, l = short
- W = wrinkled, w = smooth
- Y = yellow, y = white
- R = ribbed, r = grooved

Which of the following is the genotype for a short, wrinkled, yellow, grooved seed?

- a. IIWwyyrr
- b. LLWWyYRr
- c. LIWwYYRr
- d. IIWwYYrr

23. Mendel discovered principles of inheritance because he:

- a. Observed simultaneously all of the many characteristics in which the parents differed.
- b. Believed that the hereditary characteristics of two individuals became thoroughly blended in the offspring.
- c. Ignored all characteristics except a few markedly contrasting ones in which he studied.
- d. Studied only the offspring obtained from a single mating.

For the next three questions, use the following key to indicate how many different kinds of gametes (with respect to the traits listed) could be produced by each of the individuals described.

KEY: a = 1, b = 2, c = 4, d = 8

24. An individual with the genotype BBFF.

25. An individual with the genotype ddffMm.

26. An individual with the genotype BbffMm.

27. Carriers of the colour-blindness trait include:

- a. Men who are heterozygous for the trait.
- b. Men who are homozygous for the trait.
- c. Women who are heterozygous for the trait.
- d. Women who are homozygous for the trait.

28. Normal human eggs have:

- a. 22 autosomes and an X chromosome.
- b. 22 autosomes and a Y chromosome.
- c. 23 autosomes.
- d. 46 chromosomes.

29. A strand of DNA with the sequence A A C T T G will have a complimentary strand with the following sequence:

- a. CCAGGT
- b. AACTTG
- c. TTCAAG
- d. TTGAAC

30. A pedigree chart shows:

- a. The genotypic ratios of the offspring.
- b. The types of gametes produced by the parents.
- c. The pattern of inheritance of a specific gene.
- d. Which genes are co-dominant.
- e. The genotypes of any parents.

For the next four questions, use the following key:

KEY: a = All the offspring will exhibit the dominant trait.

b = All the offspring will exhibit the recessive trait.

c = The recessive trait will show up in about 50% of the offspring.

d = The dominant trait will show up in about 75% of the offspring.

What will be the result if:

31. Bb mates with bb?

32. BB mates with bb?

33. bb mates with bb?

34. Bb mates with Bb?

35. Exchange of genetic material takes place in

(a) vegetative reproduction

(b) asexual reproduction

(c) sexual reproduction

(d) budding

36. Two pink coloured flowers on crossing resulted in 1 red, 2 pink and 1 white flower progeny. The nature of the cross will be

(a) double fertilisation

(b) self-pollination

(c) cross-fertilisation

(d) no fertilization

37. A cross between a tall plant (TT) and short pea plant (t) resulted in progeny that were all tall plants because

(a) tallness is the dominant trait

(b) shortness is the dominant trait

(c) tallness is the recessive trait

(d) height of pea plant is not governed by gene 'T' or 't'

38. Which of the following statement is incorrect?

(a) For every hormone, there is a gene.

(b) For every protein, there is a gene.

- (c) For the production of every enzyme, there is a gene.
- (d) For every molecule of fat, there is a gene

39. If a round, green seeded pea plant (RR yy) is crossed with wrinkled, yellow seeded pea plant, (rr YY) the seeds produced in the F1 generation are

- (a) round and yellow
- (b) round and green
- (c) wrinkled and green
- (d) wrinkled and yellow

40. In human males, all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are

- (i) large chromosome
 - (ii) small chromosome
 - (iii) Y-chromosome
 - (iv) X-chromosome
- (a) (i) and (ii)
 - (b) (iii) only
 - (c) (iii) and (iv)
 - (d) (ii) and (iv)

41. The maleness of a child is determined by

- (a) the X chromosome in the zygote
- (b) the Y chromosome in zygote
- (c) the cytoplasm of germ cell which determines the sex
- (d) sex is determined by chance

42. zygote which has an X-chromosome inherited from the father will develop into a

- (a) boy
- (b) girl
- (c) X- chromosome does not determine the sex of a child
- (d) either boy or girl

43. Select the incorrect statement

- (a) Frequency of certain genes in a population change over several generations resulting in evolution
- (b) Reduction in weight of the organism due to starvation is genetically controlled
- (c) Low weight parents can have heavyweight progeny
- (d) Traits which are not inherited over generations do not cause evolution

44. New species may be formed if

- (i) DNA undergoes significant changes in germ cells
 - (ii) chromosome number changes in the gamete
 - (iii) there is no change in the genetic material
 - (iv) mating does not take place
- (a) (i) and (ii)
 - (b) (i) and (iii)
 - (c) (ii), (iii) and (iv)
 - (d) (i), (ii) and (iii)

45. Two pea plants one with round green seeds ($RRyy$) and another with wrinkled yellow ($rrYY$) seeds produce F_1 progeny that have round, yellow ($RrYy$) seeds. When F_1 plants are selfed, the F_2 progeny will have a new combination of characters. Choose the new combination from the following

- (i) Round, yellow
 - (ii) Round, green
 - (iii) Wrinkled, yellow
 - (iv) Wrinkled, green
- (a) (i) and (ii)
 - (b) (i) and (iv)
 - (c) (ii) and (iii)
 - (d) (i) and (iii)

46. A trait in an organism is influenced by

- (a) paternal DNA only
- (b) maternal DNA only

- (c) both maternal and paternal DNA
- (d) neither by paternal nor by maternal DNA

47. From the list given below, select the character which can be acquired but not inherited

- (a) colour of eye
- (b) colour of skin
- (c) size of body
- (d) nature of hair

48. The two versions of a trait (character) which are brought in by the male and female gametes are situated on

- (a) copies of the same chromosome
- (b) two different chromosomes
- (c) sex chromosomes
- (d) any chromosome

49. Select the statements that describe characteristics of genes

- (i) genes are a specific sequence of bases in a DNA molecule
 - (ii) a gene does not code for proteins
 - (iii) in individuals of a given species, a specific gene is located on a particular chromosome
 - (iv) each chromosome has only one gene
- (a) (i) and (ii)
 - (b) (i) and (iii)
 - (c) (i) and (iv)
 - (d) (ii) and (iv)

50. In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F₂ is

- (a) 1 : 3
- (b) 3: 1
- (c) 1: 1
- (d) 2: 1

51. The number of pair (s) of sex chromosomes in the zygote of humans is

- (a) one
- (b) two
- (c) three
- (d) four

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