2022/12

B.Sc. BIOTECHNOLOGY
THIRD SEMESTER (REPEAT)
GENETICS
BBT-301
[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

(Objective)

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. A condition in which two alleles for a given gene are similar to each other is known as:
   a. Heterozygous
   b. Recessive
   c. Homozygous
   d. Dominant

2. The cross between a dominant individual and a recessive individual to know the genotype of a dominant individual is known as:
   a. Back cross
   b. Test cross
   c. Both
   d. None

3. The innate tendency of the offspring to resemble their parents is called:
   a. Variation
   b. Inheritance
   c. Hereditary
   d. Resemblance

4. Which among the following was not explained by the Mendel's law of dominance?
   a. Characters are controlled by discrete units called factors
   b. Factors occur in pairs
   c. Every factor has alternate forms known as alleles
   d. In a dissimilar pair of factors one member of the pair dominate over the other

5. Which among the following is an X-linked inheritance?
   a. Alkaptonuria
   b. Sickle cell anaemia
   c. Color Blindness
   d. Myotonic dystrophy

6. Y-linked traits are inherited:
   a. Only by female
   b. Only by male
   c. A diseased female and a normal male
   d. By both male and female

7. Men with color blindness inherited the genes for it from:
   a. Their mother
   b. Their father
   c. Either their mother and father
   d. None

8. The percentage of people that cross over is higher when:
   a. The genes are in a distinct cell closer to one another
   b. Related genes are separated by a larger distance
   c. There is no relationship between genes
   d. Connected genes are separated by a smaller distance

9. The trait expressed in F1 generation is:
   a. Parental
   b. Recessive
   c. Dominant
   d. Recombinant

10. Genotype and phenotype of a monohybrid cross are:
    a. 3:1 and 1:2:1
    b. 1:2:1 and 3:1
    c. 1:2:1 and 9:3:3:1
    d. 9:3:3:1 and 1:2:1

11. The alternate form of a gene is called as:
    a. Recessive character
    b. Dominant character
    c. Alleles
    d. Alternative gene

12. Who is regarded as the Father of Genetics?
    a. Bateson
    b. Morgan
    c. Mendel
    d. Watson

13. This is why Mendel failed to notice the linking phenomenon in his experiments:
    a. He solely researched pure plants
    b. He lacked a strong microscope
    c. The characters he looked at were on different chromosomes
    d. A large number of chromosomes to manage

14. Which of the following is incorrect with respect to mutation?
    a. Sudden
    b. Continuous
    c. Change in chromosomes and genes
    d. Leads to variation in DNA

15. The 'Mutation' term was firstly coined by:
    a. Seth Wright
    b. J. Muller
    c. Morgan
    d. Huge de Vries

16. Monosomy means:
    a. Lack of one pair of chromosome
    b. Lack of one of any one pair of chromosome
    c. Presence of an extra chromosome
    d. Presence of an extra set of chromosome

17. Down syndrome is:
    a. Sex-linked
    b. Dominant
    c. Recessive
    d. Chromosomal

18. This statement describes the Hardy-Weinberg law the best:
    a. It is impossible to predict expected allele frequencies mathematically
    b. In large populations, dominant alleles become more prevalent
    c. Allele frequency changes over a period of time in a large population
    d. Mechanism of inheritance in a large population does not change allele frequency

19. Mendel's findings were rediscovered by:
    a. Correns
    b. De Vries
    c. Tschermark
    d. All

20. Where are the genes for cytoplasmic male sterility in plants located?
    a. Chloroplast genome
    b. Mitochondrial genome
    c. Cytosome
    d. None of the above

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Elaborately explain the phenomenon of gene interaction and how it deviates from normal Mendelian Genetics. 10

2. a) How Law of Independent assortment differs from Law of Segregation? 6+4=10
   b) Explain Law of Dominance with an example.

3. Explain the terminology- 2×5=10
   Back cross, Codominance, Pleiotrophy, Test cross, lethal genes

4. a) What do you mean by alleles? 2+8=10
   b) Explain the allelic ratio of Recessive epistasis with a suitable example.

5. a) Discuss the pattern of sex determination in various organisms and its effect against genetic and epigenetic factors. 6+4=10
   b) Explain various types of Aneuploidy in Human.

6. a) Distinguish between Mendelian inheritance and cytoplasmic inheritance. 5+5=10
   b) Explain maternal effects in non Mendelian inheritance with an example.

7. Explain small scale mutations and classify them with diagrams. 6+4=10
   State four applications of chromosomal mutations.

8. a) The phenotypic distribution of MN blood types controlled by the co-dominant allele among 200 persons are as follows: 5+5=10
   Type M = 114
   Type MN = 76
   Type N = 10
   Calculate the allelic frequencies.
   b) What are the five assumptions of the Hardy Weinberg equilibrium and describe the Hardy Weinberg equation?

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