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## BRAINWARE UNIVERSITY

Term End Examination 2023

Programme – B.Sc.(BT)-Hons-2018/B.Sc.(BT)-Hons-2019/B.Sc.(BT)-Hons-2020/B.Sc.  
(BT)-Hons-2021

Course Name – Genetics

Course Code - BBTH010402/BBTC102

( Semester I )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) How many different types of gametes can be formed by F1 progeny resulting from the following cross AABBCc × aabbcc ?
  - a) 3
  - b) 8
  - c) 27
  - d) 64
- (ii) Human DNA is generally present in which form?
  - a) positively supercoiled
  - b) negatively supercoiled
  - c) circular
  - d) closed circular
- (iii) Choose which one of the following functions is absent in telomere.
  - a) all telomere in a given species are same
  - b) all telomere are same in different species
  - c) Number of repeats in telomere is 100-1000 bp
  - d) telomere is single stranded at the end
- (iv) The graphical representation to calculate the probability of all possible genotypes of offsprings in a genetic cross is called as
  - a) Pedgree analysis
  - b) Punnet square
  - c) Karyotype
  - d) chromosome map
- (v) Cyclin protein is required for cell cycle, which other molecule is essential for completion of cell cycle?
  - a) CCK
  - b) CKc
  - c) CKd
  - d) CdK
- (vi) Which one following statement is correct wrt genic balance theory of Drosophila?
  - a) Y chromosome has no value in sex determination in Drosophila
  - b) if X/A ratio is >1 then it is female
  - c) if X/A ratio is <.5 then it is male
  - d) None
- (vii) When dominant and recessive alleles express together it is called

- a) Codominance  
c) amphidominance
- b) Dominance  
d) pseudodominance
- (viii) In the following population, what would be the allelic frequency for the dominant allele? 20 homozygous recessives; 320 homozygous dominants; 160 heterozygotes
- a) 0.3  
c) 0.7
- b) 0.8  
d) 0.6
- (ix) If the genes are located in a chromosome in the sequence of A-B-C-D-O-T. Then which of the gene pairs will have least probability of being inherited together?
- a) C and D  
c) A and B
- b) A and T  
d) O and T
- (x) Inactivation of X chromosome in the formation of Barr body takes place
- a) on 20th day after fertilization  
c) about 25th day after fertilization
- b) about 16th day after fertilization  
d) about 10th day after fertilization
- (xi) Select the correct statement from the ones given below with respect to dihybrid cross:
- a) Tightly linked gene on the same chromosome show very few recombination.  
c) genes loosely linked on the same chromosome show similar recombinations as the tightly linked genes.
- b) Genes far apart on the same chromosome Show very few recombination.  
d) Linked genes are located on different chromosome
- (xii) What would be the allelic frequency for the dominant allele in the following population? 20 homozygous recessives; 320 homozygous dominants; 160 heterozygotes
- a) 0.3  
c) 0.7
- b) 0.8  
d) 0.6
- (xiii) There are three genes a, b and c. Percentage of crossing over between a and b 20%, b and c is 28% and a and c is 8% . What is the sequence of the genes on chromosomes.
- a) b, a and c  
c) a, c ,b
- b) a, b and c  
d) none
- (xiv) Which of the following theory supports blending theory of inheritance?
- a) Particulate theory  
c) Law of dominance
- b) Segregation theory  
d) None
- (xv) The probability of all possible genotypes of offsprings in a genetic cross when represented in a graphical form is known as
- a) Pedgree analysis  
c) Karyotype
- b) Punnet square  
d) chromosome map

### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Validate the different modification histone molecule. (3)
3. Explain aneuploidy and euploidy with example (3)
4. Analyze the difference between bacterial and eukaryotic DNA. (3)
5. Illustrate why Drosophila is considered suitable for genetic experiment. (3)
6. Name two sex chromosome disorder and their symptoms (3)

OR

What is incomplete penetrance and the reason behind it? (3)

### Group-C

(Long Answer Type Questions)

5 x 6=30

7. What is base analogue? Discuss its mode of action in causing mutation. (5)

8. What is Hardy and Weinberg Law? Explain with example. (5)
9. Discuss the different types of sex differentiation among animals. (5)
10. Define base analogue and how does base analogues cause mutation in DNA? (5)
11. What is called as tautomerism? What is frameshift mutation. (5)
12. What do you mean by tautomerism? Pictorially explain the frameshift mutation. (5)

**OR**

What is gene interaction? Distinguish between epistatic and hypostatic gene (5)

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