



## **BRAINWARE UNIVERSITY**

## **Term End Examination 2022**

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

- Choose the correct alternative from the following :
- (i) Bottle neck phenomenon is associated with

a) Migration

b) Recombination

c) Genetic Drift

- d) Natural selection
- (ii) Which of the following is not an example of model organism?

a) Arabidopsis

b) Coenorabdhitis elegans

c) Ficus

- d) Mouse
- (iii) Splicing mechanism is absent in which of the following organism

a) E.coli

b) Cow

c) Mango

d) Ficus

(iv) Monosomy is an example of

a) Euploidy

b) Polyploidy

c) Aneuploidy

- d) None
- (v) Normally the DNA pairing has A-T and GC pairing, however these bases can exit in alternative states owing to rearrangement called as

a) point mutation

b) frameshift mutation

c) analogous mutation

- d) tautomerisation
- (vi) In a mutational event, the replacement adenine with guanine is known as

a) transition

b) transcription

c) transvertion

- d) frameshift mutation
- (vii) A base substitution that causes regular codon to change into another codon that codes for different amino acid is said to be

a) nonsense mutation

b) silent mutation

c) missense mutation

d) Point mutation

(viii) The number of copies in highly repetitive DNA is

a) 100-1000

b) 1-10 lakh

c) 20-50 lakh

d) 10000-20000

(ix) Which of the following formulas lets you predict the genotypic frequency of the next

|  | generation?   |  |        |  |
|--|---|--|--------|--|
|  | a) X2 = sum [(o - e)2 / e]  | b) d = 0.5 lambda / n * sin (theta)          |        |  |
| (x)  | c) $p2 + 2pq + q2 = 1$ d) $dp + q = 1$<br>In Drosophila an organism with the genetic composition AA+XXY will be a normal female. What will be the case for mammal?  |  |        |  |
| (xi)   | <ul><li>a) Normal female</li><li>c) Klinefelter syndrome</li><li>If you cross a red eyed pure breeding female Dr</li><li>the F1 males so produces were crossed with wh</li></ul>  |  |        |  |
|  | colour of their daughters and sons in F2?  a) Both daughters and sons red avad  | b) Daughters with both eye colour while      | sons   |  |
|  | Both daughters and sons red eyed  | with white eye                               |        |  |
|  | c) Both daughters and sons with both eye colours  | d) Daughters with red eye and sons with eyes | white  |  |
| (xii)  | i) A particular locus, frequency A allele is 0.6 and that of a is 0.4. Calculate the frequency of heterozygote in an random mating population at equilibrium?   |  |        |  |
|  | a) 0.16   | b) 0.48                                      |        |  |
| ,  | c) 0.35   | d) 0.24                                      |        |  |
| (xiii  | xiii) The linkage map of X-chromosome of fruitfly has 66 units, with yellow body gene (y) at one end and bilobed hair (b) gene at the other end. The recombination frequency between these two gene (y and b) should be.  |  |        |  |
|  | a) 0.66   | b) > 50%                                     |        |  |
| , .  | c) less than equal to 50%   | d) 1   |        |  |
| (XIV   | Cistron is a part of which expressed  |  |        |  |
|  | a) mRNA and tRNA  | b) rRNA and protein                          |        |  |
| (xv)   | c) mRNA and tRNA & rRNA and protein<br>Inheritance of flower colour is an example of in   | d) None<br>complete dominance found in       |        |  |
|  | a) Antirrhinum<br>c) Solanum  | b) Pisum<br>d) Hibiscus                      |        |  |
|  | Grou  | p-B  |        |  |
|  | (Short Answer Ty  | •  | x 5=15 |  |
| 4. Write down the principle of fluorescence in situ hybridization. |   |  | (3)    |  |
| 6. E   | 6. Elaborate natural selection with a suitable example.  OR   |  |        |  |
| Differentiate between dominant and recessive epistatis.            |   |  | (3)    |  |
|  | Grou  | p-C  |        |  |
|  | (Long Answer Ty   | <del>-</del>                                 | x 6=30 |  |
| 7.   | What is base analogue? Discuss its mode of actio  | n in causing mutation.                       | (5)    |  |
| 8.   | What is the between allelic and non allelic interaction . Explain with example the mode of $(5)$ nheritance pattern in non allelic interaction. [3 + 7]   |  |        |  |
| 9.<br>10.  | Discuss gene balance theory of Drosophila. Explain aneuploidy and euploidy with example. (Betty has normal vision, but her mother is color blind. Bill is color blind. If Bill and Betty marry and have a child together, what is the probability in percent that the child will be |  |        |  |
|  | color blind?<br>What is a Barr hody? How is it related to the Lyon  | hynothesis?                                  | (5)    |  |
| 12.  | What is a Barr body? How is it related to the Lyon hypothesis? (5) Elaborate the phenomenon of multiple allelism and co-dominance taking ABO blood group (5) as example.  |  |        |  |

Red- green color blindness in humans is due to an X-linked recessive gene. A woman whose father is color blind possesses one eye with normal vision and other eye with color blindness. Propose an explanation for this womens vision pattern and would it be possible for a man to have one eye with normal color vision and one eye with color blindness?

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