# BRAINWARE UNIVERSITY

## Term End Examination 2024-2025
## Programme – B.Sc.(Ag)-Hons-2022/B.Sc.(Ag)-Hons-2023/B.Sc.(Ag)-Hons-2024
## Course Name – Fundamentals of Genetics
## Course Code - CC-BAG274(T)
## ( Semester II )

**Full Marks : 50** **Time : 2:0 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 20=20

1. *Choose the correct alternative from the following :*

(i) Select the right proposer of 'One gene one enzyme hypothesis'.
a) T. H. Morgan b) Beadle and Tatum
c) Bateson and Punnet d) de Vries

(ii) If one gene effects more than one characters, then what type of genetics is working?
a) Lethal genes b) Poly gene
c) Multiple alleles d) Pleiotropic gene

(iii) Incase of Multiple allelism, if the numbers of alleles is (n) then what is the number of possible genotype would be expected?
a) 1/2n (n+1) b) 2n
c) n (n+1) d) None of these

(iv) Who coined the term 'Chromosome'?
a) Strasburger b) Waldeyer
c) Darlington d) Balbiani

(v) Choose the appropriate term on the following Operon-'A protein that can be bind to DNA or RNA and inhibit the expression of a gene'.
a) Suppressor b) Repressor
c) Enhancer d) Terminator

(vi) In a DNA, if the amount of Guanine is 35% then what will be the amount of Adenine base to be expected?
a) 0.35 b) 0.7
c) 0.15 d) 0.3

(vii) Select the right term which appliable in case of Tryptophan operon.

a) Positive operon
b) Negative operon
c) Sometimes as positive and sometimes negative
d) Always Neutral

(viii) Lac operon is the best example for which one of the following operon?

a) Inducible operon
b) Attenuation
c) Repressible operon
d) Both Inducible and Repressible operon

(ix) Who proposed the 'Nucleosome solenoid model'?

a) Hartz
b) Dupraw
c) Finch and Klug
d) Karl Wilhelm

(x) Who first time discovered the Transformation process?

a) Meselson and Stahl
b) Hershey and Chase
c) Griffith
d) Watson and Crick

(xi) Which non-radioactive isotope was used by Messelson and Stahl in their experiment?

a) P32
b) S35
c) N15
d) None

(xii) If a double stranded DNA has 20% of cytosine, what will be the percentage of adenine in it ?

a) 0.2
b) 0.4
c) 0.3
d) 0.6

(xiii) Relate the following chromosomal abnormalities with Down syndrome.

a) Monosomy
b) Dimonosomy
c) Nullisomy
d) Trisomy

(xiv) Interpret the possible number of Linkage group present in a given diploid individuals if its have chromosome numbers 2n=24.

a) 24
b) 12
c) 48
d) 8

(xv) When the DNA synthesis occurs in a cell ?

a) Prophase
b) Metaphase
c) Anaphase
d) None of these

(xvi) What we can say if a gene has multiple effects ?

a) Multiple allelism
b) Pleiotropism
c) Polygeny
d) Epistasis

(xvii) Who proposed the 'Theory of Pangenesis'?

a) Lamarck
b) Wolff
c) Charles Darwin
d) August Weismann

(xviii) Infer the right statement on 'Okazaki fragments'.

a) The strand that is used as template for continuous DNA synthesis
b) The strand that is used as template for discontinuous DNA synthesis
c) The strand that is synthesized discontinuously by using Lagging strand as a template
d) Small fragment of RNA attached initially with the help of primase for DNA syntheisis

(xix) What will be the classical ratio When dominant epistasis is operative between two gene loci?

a) 9,3,4
b) 12,3,1
c) 9,7
d) 15,1

(xx) A person with blood group AB can receive blood from which of the following persons?

a) A or O b) AB
c) B d) All of thsese

## Group-B

(Short Answer Type Questions) 2.5 x 10=25

2. Differentiate between Homozygous, Heterozygous and Hemizygous. (2.5)
3. Propose the role of quantitative genetics in Plant improvement. (2.5)
4. How penetrance is different from expressivity. (2.5)
5. Briefly explain about epistatic and hypostatic gene. (2.5)
6. What is criss cross inheritance? Give an example. (2.5)
7. What is the status of colour blindness in the children whose parents are carrier mother and the normal visioned father ? (2.5)
8. Explain the concept of dominance and epistasis. (2.5)
9. Define recessive epistasis. (2.5)
10. Make an outline on- Central Dogma. (2.5)
11. Dissect the significance of wobble hypothesis. (2.5)

**OR**

Analyze an optimal prokaryotic promoter with suitable diagram. (2.5)

## Group-C

(Long Answer Type Questions) 5 x 1=5

12. Analyze the operon model of gene regulation using lac operon of E. coli as an example. (5)

**OR**

A cross was made between pure wild type males and brown eyed curled winged females of Drosophila. The F1 females were test crosses. The F2 progeny was as follows. Wild Type 200, Brown eye curled wing 150, Brown eye normal wing 30 , Normal eye curled wing 20. Calculate the genetic distance between brown eye and curled wing loci. (5)

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