BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Sc.(BT)-Hons-2022
Course Name – Plant Biotechnology
Course Code - BBTC305
(Semester III)

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) Recall which of the following is a limitation of morphological markers in breeding programs?

a) They mask the effects of linked minor genes.
b) They are highly influenced by the agroclimatic environment.
c) They cover the entire genome.
d) They are co-dominant.

(ii) Determine what is meant by cryopreservation in the context of plant tissue culture?

a) Preservation of plant cells at ultra-low temperatures
b) Preservation of plant cells in liquid nitrogen
c) Preservation of plant cells in a freezer
d) Preservation of plant cells in a greenhouse

(iii) Judge which of the following is not a benefit of conserving plant biodiversity through tissue culture?

a) Restoration of endangered species
b) Reduction of genetic diversity
c) Study and research on rare plants
d) Conservation of unique genetic traits

(iv) Determine which of the following is a potential challenge in using plant tissue culture for biodiversity conservation?

a) High cost
b) Rapid multiplication of plant species
c) Lack of sterile conditions
d) Use of native soils

(v) Predict which of the following pignments will NOT be found in the Light Harvesting Complex

a) Chl b
b) Carotenoid
c) Chl a
d) Phycobilins

(vi) Name the growth of plant tissues in artificial media _____

a) Gene expression
b) Transgenesis
c) Plant tissue culture
d) Cell hybridization

(vii) Cite which of the following plant hormone control fruit ripening?

a) Ethylene
b) Auxin

c) Gibbrellins
d) Abscisis acid

(viii) Cite the term given to the ability of single cells to divide and produce all the differentiated cell in the organism?

a) Unipotent
b) Pluripotent
c) Multipotent
d) Totipotency

(ix) Cite the biochemical function of the G-protein system:

a) Amplifier
b) Inhibitor
c) Regulator
d) None of the above

(x) Recall the purpose of using a poly T oligonucleotide as a primer in cDNA synthesis?

a) To protect RNA from degradation
b) To increase the length of DNA strands
c) To transcribe DNA
d) To bind to poly A tails of mRNA

(xi) Identify the correct equation for photosyntehsis

a) $6\ H2O + C6H12O6 \rightarrow 6\ O2 + 6\ CO2$
b) $2\ CO2 + 2\ H2O \rightarrow C2H5OH + 2\ O2$
c) $6\ CO2 + 6\ H2O \rightarrow C6H12O6 + 6\ O2$
d) $C2H5OH + 2\ O2 \rightarrow 2\ CO2 + 2\ H2O$

(xii) Determine the site of thylakoid reactions of photosynthesis

a) Nuclear Membrane
b) Stroma of the Chloroplast
c) Outer Membrane of Chloroplast
d) Internal Membrane of stacks within chloroplast

(xiii) Determine what are SSR

a) Simple sequence repeats
b) Sequential Simple repeats
c) Simplified Sequential Repeats
d) None of these

(xiv) Cite what can cause a plant cell to modify its metabolism and development, in addition to hormones

a) Light
b) Gravity
c) Temperature
d) All of the above

(xv) Cite the key advantage of RAPD markers?

a) High reproducibility
b) Co-dominance
c) Easy to design primers
d) Suitable for quantitative traits

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define two types of DNA markers used in molecular breeding. (3)
3. Explain the nature of SSR (3)
4. Illustrate with brief notes the four main whorls of a stereotypical flower, starting from the base and working upwards? (3)
5. Compare between diffusion and osmosis. (3)
6. Determine the different methods of protoplast fusion? (3)

OR

What are Polymorphic Markers, and evaluate why is their polymorphism important in genetic mapping? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Discuss the role of ATP and NADPH in the Calvin Benson Cycle. (5)
8. Chart out the main phases and the key steps of Glycolysis. (5)
9. Identify any five applications of Micropropagation. (5)
10. Evaluate the different methods of Gene transfer and which one is widely accepted by the scientists? Write briefly on the widely used method. (5)
11. Schematically illustrate and analyze the mitochondrial ETC in plants. (5)
12. Justify the use of molecular markers in crop improvement (5)

OR

Write what you understand by linkage mapping and its role in MAS (5)

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