Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Science

End Sem Examination Dec 2024

BT3CO09 Plant Physiology & Biotechnology

Programme: B.Sc. Branch/Specialisation: Biotechnology

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	The exchange of CO_2 and O_2 from the atmosphere by leaves is called- (a) Diffusion (b) Osmosis (c) Endosmosis (d) Imbibition	**1**	2	1	1	1
	ii.	Which of the following processes is important in seed germination? (a) Osmosis (b) Diffusion (c) Imbibition (d) Plasmolysis	**1**	2	1	1	1
	iii.	Which of the following is non symbiotic nitrogen fixing bacteria? (a) Azatobacter species (b) Clostridium species (c) Both (a) & (b) (d) None of these	**1**	1	2	1	1
	iv.	Which of the following is a gaseous plant hormone? (a) IBA (b) Ethylene (c) Abscisic acid (d) NAA	**1**	1	2	1	1
	v.	Why dimethyl sulfoxide used for? (a) A gelling agent (b) Cryoprotectant (c) Chelating agent (d) An alkylating agent	**1**	1	3	1	1
	vi.	Totipotency refers to which of the following- (a) Development of fruits from flowers in a culture (b) Development of an organ from a cell in a culture medium (c) Flowering in a culture medium (d) All of these	**1**	2	3	1	1

vii	Artificial seeds are- (a) Seeds produced in laboratory condition (b) Seeds encapsulated in a a gel (c) Somatic embryos encapsulated in a gel (d) Zygotic embryos encapsulated in a gel	**1**	2	4	1	1
vii	The process of pollen grain are transferred from the anthers of a flower to the stigma of same frower called as- (a) In vitro fertilization (b) Xenogamy (c) Autogamy (d) Gietonogamy	**1**	2	4	1	1
ix.	What exactly are somatic hybrids? (a) Hybrid protoplasts (b) Protoplasts (c) Fused plasmids (d) Fused chloroplast	**1**	2	5	1	1
x.	Cybrids are known as- (a) Nuclear hybrids (b) Hybrid plants derived from cross pollination (c) Cytoplasmic hybrids (d) Cytological hybrids	**1**	2	5	1	1
Q.2 i.	What do you understand by guttation? Why guttation is important?	**2**	2	1	1	1
ii.	Describe the mechanism of transpiration with its importance.	**3**	2	1	1	1
iii.	Describe the opening and closing of stomata with schematic diagram.	**5**	2	1	1	1
OR iv.	Discuss the nutrient uptake methods in plant with detail.	**5**	2	1	1	1
Q.3 i.	What do you understand by vernalization?	**2**	2	2	1	1
ii.	What is photphosphorylation? Give detail about cyclic photphosphorylation.	**8**	2	2	1	1
OR iii.	What is the role of plant hormone in plant growth? Discuss about auxin and gibberellins in detail.	**8**	2	2	1	1
Q.4 i.	What is callus? Define the importance of callus.	**3**	2	3	1	1
ii.	What do you understand by micropopagation? Write its advantage and disadvantage.	**7**	2	3	1	1
OR iii.	What is the meaning of organogenesis, embryogenesis? Describe in detail.	**7**	2	3	1	1

Q.5 i.	Define gynogenic haploid. How they formed?	**4**	2	4	1	1
ii.	What do you understand by Anther culture? Describe various method of Anther culture.	**6**	2	4	1	1
OR iii.	Describe chromosome elimination techniques for production of haploids in cereals.	**6**	2	4	1	1
Q.6	Attempt any two:					
i.	What is somaclonal variation write its methods?	**5**	2	5	1	1
ii.	Describe somatic hybridization with its limitation.	**5**	2	5	1	1
iii.	Describe the methods of protoplast isolation with its application.	**5**	2	5	1	1

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Marking Scheme
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Q.1	i)	(a) Diffusion.	**1**
	ii)	(b) Diffusion.	**1**
	iii)	(c) Both.	**1**
	iv)	(b) Ethylene	**1**
	v)	(b) Cryoprotectant	**1**
	vi)	(b) Development of an organ from a cell in a culture medium	**1**
	vii)	(c) Somatic embryos encapsulated in a gel	**1**
	viii)	(c) Autogamy	**1**
	ix)	(a) Hybrid protoplasts	**1**
	x)	(c) cytoplasmic hybrids	**1**
Q.2	i.	What do you understand by Guttation? Why guttation is Important.	**2**
	ii.	Describe the mechanism of transpiration with its importance.	**3**
	iii.	Describe the opening and closing of stomata with schematic diagram.	**5**
OR	iv.	Discuss the nutrient uptake methods in plant with detail.	**5**
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Q.6			
	i.	What is Somaclonal variation write its methods?	**5**
	ii.	Describe Somatic hybridization with its limitation.	**5**
	iii.	Describe the Methods of protoplast isolation with its application.	**5**

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1. (i) a
(ii) b
(iii) c
(iv) b
(v) b
(vi) b
(vii) c
(viii) c
(ix) a
(x) c

2(i) Definition & importance

(ii) Mechanism with importance. a Schematic draw will be best.

(iii) Mechanism of opening & closing: why require opening & closing what are different pores & a sketch will be the best answ

(iv) Nutrient uptake methods in details
⇒ Active method
⇒ passive methods
⇒ hypothesis
All inclusive will be best

Q.3 (i) Definition of Vernalization

(ii) Details about photophosphorylation & cyclic photophosphorylation
⇒ photosystem involved
⇒ Electron transport
⇒ ATP products
⇒ oxygen evolution

(iii) Need to write about various plant hormones & their role/importance. further details is required about auxin & gibberellin

4(i) Definition & significance is required

(ii) The exact meaning of micropropagation, why it is necessary what are the benefits & disadvantages of micropropa

(iii) It need to define organogenesis. Also need to write about Embryogenesis.

5 (i) Need to discuss about gynogene haploid & various steps to produce gynogenic haploid

(ii) Need to discuss about anther culture in details and various methods used for anther culture

(iii) Description with importance of Chromosome elimination technique

6 (i) Need details about somaclonal variation
⇒ why it happen
⇒ what are the factors for this
⇒ Its merit & demerit

(ii) Somatic hybridization
⇒ steps for hybridization
⇒ Selection of somatic hybrid
⇒ Limitation

(iii) Various physical, chemical, & enzymatic methods of protoplast isolation
⇒ Its application in various field