

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MSc DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch - BIOCHEMISTRY

ADVANCED PLANT BIOCHEMISTRY

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following is a major driving force for water absorption in plants? a) Osmotic gradient b) Active transport c) Gravity d) Symport mechanism	K1	CO1
	2	In the symplast pathway, water and solutes move through the plant via: a) Cell walls b) Vacuoles c) Plasmodesmata d) Intercellular spaces	K2	CO1
2	3	Gibberellins are known to promote which of the following processes in plants? a) Seed dormancy b) Fruit ripening c) Stem elongation d) Leaf senescence	K1	CO2
	4	The secondary metabolite that is known for its role in plant pigmentation and UV protection a) Alkaloids b) Flavonoids c) Terpenoids d) Phenols	K2	CO2
3	5	Nodulation and nitrogen fixation in legumes are primarily regulated by which bacterial group? a) Rhizobia b) Azotobacter c) Cyanobacteria d) Nitrosomonas	K1	CO3
	6	The enzyme responsible for reducing sulfate to sulfide in sulfur metabolism is called _____ a) Ammonium transporter b) Nitrite reductase c) Glutamine synthetase d) Sulfite reductase	K2	CO3
4	7	Which type of enzyme is commonly produced by pathogens to degrade plant cell walls during infection? a) Protease b) Lipase c) Cellulase d) Amylase	K1	CO4
	8	Which of the following triggers Systemic Acquired Resistance (SAR) in plants? a) Salicylic acid b) Ethylene c) Cytokinins d) Gibberellins	K2	CO4
5	9	Which complex is involved in transporting proteins into the mitochondrial matrix? a) TOM complex b) TIM23 complex c) OXA complex d) SAM complex	K1	CO5
	10	Cytoplasmic male sterility is caused by mutations in: a) Nuclear DNA b) Chloroplast DNA c) Mitochondrial DNA d) Ribosomal RNA	K2	CO5

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	How do plants utilise the symplast and apoplast pathways to facilitate water absorption?	K3	CO1
		(OR)		
	11.b.	Photorespiration is metabolically costly. Explain.		

Cont...

2	12.a.	How does abscisic acid (ABA) solve the challenges faced by plants during drought and other stress conditions?	K3	CO2
	(OR)			
	12.b.	Identify the role of polyamines in plant growth and stress response.		
3	13.a.	How do nitrogen-fixing bacteria make use of Nif genes to facilitate the process of biological nitrogen fixation?	K4	CO3
	(OR)			
	13.b.	How do plants apply sulfate activation, reduction, and its incorporation into amino acids during sulfur metabolism?		
4	14.a.	Compare and contrast Systemic Acquired Resistance (SAR) and Induced Systemic Resistance (ISR).	K4	CO4
	(OR)			
	14.b.	Inspect the role of R genes in plant-pathogen interactions and the process of R gene-mediated disease resistance.		
5	15.a.	Translocase of the Inner Membrane complex plays a crucial role in importing and sorting proteins into the mitochondrial matrix and inner membrane. Justify.	K5	CO5
	(OR)			
	15.b.	Cytoplasmic male sterility (CMS) is a valuable tool in hybrid seed production. Justify.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Compare and contrast the C3 and C4 pathways of carbon fixation in plants.	K4	CO1
2	17	Evaluate the molecular mechanisms behind auxin's action in coordinating the growth and development of plants.	K4	CO2
3	18	How can we examine the GOGAT (Glutamate Synthase) pathway to understand its importance in nitrogen metabolism in plants?	K4	CO3
4	19	Categorise the different modes of pathogen attack on plants, including mechanical force and chemical weapons such as enzymes, toxins, and growth regulators.	K5	CO4
5	20	Explain the role of the transit peptide in protein transport to plastids.	K5	CO5

Z-Z-Z

END