

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(Third Semester)

Branch- **BIOTECHNOLOGY**

METABOLISM

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry **EQUAL** marks

$$(10 \times 1 = 10)$$

Module No.	Question No.	Question	K Level	CO
1	1	The Enzyme that converts glucose-6-phosphate to glucose in gluconeogenesis is a) Hexokinase b) Glucose-6-phosphatase c) Glucokinase d) Enolase	K1	CO1
	2	The main enzyme responsible for glycogen breakdown is a) Glycogen phosphorylase b) Glycogen synthase c) Phosphoglucomutase d) Hexokinase	K2	CO1
2	3	The biosynthesis of saturated fatty acids occurs in a) Fatty acyl-CoA synthetase b) Acetyl-CoA carboxylase c) Lipase d) HMG-CoA reductase	K1	CO2
	4	Omega-oxidation occurs in a) Mitochondria b) Peroxisomes c) Cytoplasm d) Lysosomes	K2	CO2
3	5	De novo synthesis of purines occurs mainly in a) Liver b) Kidney c) Muscle d) Brain	K1	CO1
	6	The first committed step in de novo purine biosynthesis is catalyzed by a) PRPP synthetase b) Glutamine-PRPP amidotransferase c) Adenylosuccinate synthetase d) Hypoxanthine-guanine phosphoribosyltransferase	K2	CO1
4	7	The amino acid precursor of serotonin is a) Tyrosine b) Tryptophan c) Phenylalanine d) Glutamine	K1	CO3
	8	Starvation primarily induces a) Glycogen synthesis b) Gluconeogenesis from amino acids c) Fatty acid synthesis d) Urea excretion	K2	CO1
5	9	Iron is essential for a) Collagen synthesis b) Hemoglobin formation c) DNA replication d) Glycolysis	K1	CO4
	10	Obesity is primarily due to imbalance between a) Protein intake and metabolism b) Energy intake and expenditure b) Vitamin absorption d) Mineral metabolism	K2	CO3

Cont...

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.	Explain glycolysis and mention its main products.	K2	CO1
		(OR)		
	11.b.	Discuss the pathway and regulation of gluconeogenesis.		
2	12.a.	Explain regulation of fatty acid oxidation and synthesis.	K2	CO2
		(OR)		
	12.b.	Define phospholipids and give an example of phosphatidyl choline.		
3	13.a.	Write an essay on clinical disorders associated with nucleic acid metabolism.	K4 & K3	CO3
		(OR)		
	13.b.	Explain purine salvage pathways and their significance.		
4	14.a.	What is transamination? Explain.	K2	CO4
		(OR)		
	14.b.	Describe the biosynthesis pathways of tyrosine, tryptophan, and phenylalanine.		
5	15.a.	Discuss the clinical features of Phenylketonuria (PKU).	K2	CO5
		(OR)		
	15.b.	Explain Basal Metabolic Rate (BMR), its determinants, and clinical significance.		

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	Explain the TCA cycle in detail, including energetics, key steps, and regulation.	K3	CO1
2	17	Describe the complete pathway of beta-oxidation of fatty acids including energy yield.	K3	CO2
3	18	Explain purine salvage pathways and their significance.	K2	CO3
4	19	Discuss the urea cycle, including intermediates, enzymes, and energy requirements.	K3	CO4
5	20	Discuss the metabolism and physiological roles of calcium, iron, copper, and zinc.	K3	CO5

Z-Z-Z END