

PRACTICE SET
End Semester Examination, Spring- 2026

Program: Bachelor of Physiotherapy

Semester: II

Subject: Biochemistry

Subject Code: 23A205

Course Outcome:

On the completion of the Course, the students will be able to:

Course Outcomes	Description
CO1	To able to describe physiochemical phenomena of Osmosis, Diffusion, Donnan Membrane equilibrium. Describe the physiology of the carbohydrate Digestion in humans.
CO2	Illustrate the metabolism of carbohydrates through various anabolic and catabolic pathways like glycolysis, Krebs's cycle, Glycogen metabolism, glucuronic acid cycle etc.
CO3	Relate the structure of DNA with its function in Replication and gene expression that include both transcription and translation.
CO4	Have a chemistry knowledge of connective tissue, bone and teeth.
CO5	Have knowledge of vitamins, minerals, carbohydrates, protein, fats and balance diet.
CO6	Have a knowledge of biochemical like enzymes, endocrinology.

UNIT I

Section A (10 marks)

1. Analyze how alterations in plasma membrane transport systems can lead to disease conditions such as edema or dehydration. (CO1) (Analyze) (HOT)
2. Apply the concept of Donnan membrane equilibrium to explain ion distribution in human cells. (CO1) (Apply) (HOT)
3. Examine the biochemical basis of muscle contraction and predict the effect of ATP depletion on muscle function. (CO1) (Apply) (HOT)

4. Analyze the role of connective tissue composition in maintaining the structural integrity of organs. (CO3) (Analyze) (HOT)
5. Apply principles of nutrition to design a balanced diet for a patient with increased metabolic demand. (CO5) (Apply) (HOT)
6. Discuss how diffusion and osmosis contribute to nutrient transport across biological membranes. (CO1) (Understand) (LOT)

Section B (20 marks)

7. Analyze the structure and function of subcellular organelles and correlate their dysfunction with metabolic disorders. (CO1) (Apply) (HOT)
8. Apply the principles of physiochemical phenomena (osmosis, diffusion) to explain fluid imbalance in clinical conditions. (CO1) (Apply) (HOT)
9. Critically analyze the biochemical mechanisms involved in muscle contraction and relaxation with clinical relevance. (CO1) (Analyze) (HOT)
10. Design a nutritionally balanced diet plan for different physiological states (e.g., growth, illness) and justify your choices. (CO5) (Apply) (HOT)

UNIT II

Section A (10 marks)

11. Analyze the steps of glycolysis and predict the metabolic consequences of enzyme deficiencies. (CO2) (Analyze) (HOT)
12. Evaluate the alterations in lipid metabolism that lead to fatty liver and their clinical implications. (CO5) (Evaluate) (HOT)
13. Analyze the role of insulin in blood glucose regulation and its failure in diabetes mellitus. (CO3) (Analyze) (HOT)
14. Examine how structural variations in proteins influence their biological functions with relation to translation also explain their biological significance. (CO3) (Understand) (LOT)
15. Apply the concept of nucleic acid replication to explain mutation formation. (CO3) (Apply) (HOT)
16. Analyze the relationship between cholesterol metabolism and cardiovascular diseases. Write in details about all the diseases associated with cholesterol. (CO5) (Apply) (HOT)

Section B (20 marks)

17. Analyze carbohydrate metabolism (glycolysis, TCA cycle, glycogen metabolism) and its role in energy production. (CO2) (Analyze) (HOT)
18. Evaluate lipid metabolism pathways and their clinical significance in disorders like ketoacidosis. (CO3) (Remember) (LOT)
19. Analyze protein structure and function, and correlate abnormalities with disease conditions. (CO1) (Analyze) (HOT)
20. Explain and analyze how genetic information flows from DNA to protein, highlighting regulatory mechanisms at each stage with diagrams. (CO3) (Analyze) (HOT)

UNIT III

21. Analyze the urea cycle and predict the consequences of its dysfunction. (CO3) (Analyze) (HOT)
22. Apply knowledge of enzyme kinetics to explain the effect of inhibitors on enzyme activity. (CO6) (Apply) (HOT)
23. Analyze the role of hemoglobin in oxygen transport and its alterations in disease. (CO6) (Analyze) (HOT)
24. Write in details about nitrogen balance. Also explain how it is related to your daily food habit and justify why it's important (CO5) (Remember) (LOT)
25. Apply your understanding to differentiate between malnutrition conditions like Kwashiorkor and Marasmus and explain how it can be treated with a proper balanced diet. (CO5) (Remember) (HOT)
26. Critically analyze factors affecting Basal Metabolic Rate (BMR) and their physiological implications. (CO5) (Analyze) (HOT)

Section B (20 marks)

27. Analyze amino acid metabolism and explain the formation and disposal of ammonia in the human body. (CO4) (Analyze) (HOT)
28. Evaluate the role of enzymes in clinical diagnosis with suitable examples. Also explain how a deficiency of enzymes can lead to various disease conditions associated with all the metabolic processes in our body. (CO6) (Remember) (LOT)
29. How is Ammonia excreted from our body? Analyze the general reactions of Amino acid for the conversion of ammonia into Urea with the help of urea cycle. (CO4) (Analyze) (HOT)
30. Write in details about the definition, classification and biological significance of enzyme. How is BMR related to body's surface area? (CO6) (Remember) (LOT)

UNIT IV

31. Analyze the role of vitamins in metabolism and predict deficiency-related disorders. (CO5) (Analyze) (HOT)
32. Evaluate how different buffer systems contribute to the regulation of blood pH in the human body. (CO5) (Evaluate) (HOT)
33. Analyze the mechanism of hormone action and its effect on metabolism. (CO6) (Analyze) (HOT)
34. Evaluate the role of electrolytes in maintaining fluid balance and consequences of imbalance. (CO5) (Apply) (HOT)
35. Analyze thyroid hormone imbalance and its metabolic consequences. (CO5) (Analyze) (HOT)
36. Apply biochemical principles to interpret abnormal levels of urea and creatinine. (CO2) (Apply) (HOT)

Section B (20 marks)

37. Analyze the role of water and electrolyte balance in maintaining homeostasis and its disturbance in dehydration. (CO6) (Analyze) (HOT)
38. Evaluate endocrine regulation by pituitary, thyroid, adrenal, and pancreas with metabolic effects. (CO6) (Apply) (HOT)
39. Apply biochemical principles to interpret clinical investigations (glucose, bilirubin, cholesterol, uric acid) (CO3) (Apply) (HOT)
40. Analyze vitamin deficiencies and their biochemical and clinical manifestations with examples. (CO5) (Analyze) (HOT)

Summary Sheet

CO Wise

CO	Q. No	Marks
CO1	1,2,3,6,7,8,9,19	110
CO2	11,17,36	50
CO3	4,13,14,15,18,20,21,39	120
CO4	27,29	40
CO5	5,10,12,16,24,25,26,31,32,35,40	170
CO6	22,23,28,30,33,37,38	70
Total		560

Unit Wise

Unit	Q. No	Marks
Unit 1	1-10	140
Unit 2	11-20	140
Unit 3	21-30	140
Unit 4	31-40	140
Total		560

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	2,3,5,6,8,10,12,14,15,16,18,20,22,24,25,28,30,31,32,33,35,37,39	310
HOT	1,4,7,9,11,13,17,19,21,23,26,27,29,34,36,38,40	250
Total		560

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Disclaimer: -This is a Practice set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.