INSTITUTE OF TEACHING AND RESEARCH IN AYURVEDA

[INSTITUTE OF NATIONAL IMPORTANCE]

MINISTRY OF AYUSH, GOVERNMENT OF INDIA

B. PHARM. (AYU.) II YEAR

PHARMACEUTICAL BIOCHEMISTRY

Question Bank

SECTION A

Chapter: Introduction to Biochemistry and its correlation to *Ayurveda*

[10 marks]

1. Write a note on the correlation of Biochemistry with *Ayurveda*.
2. How the *tridoshas* can be translated into the modern concept of human system?

[2 marks]

1. Define Biochemistry and the necessity to study it.

Chapter: Introduction to bio molecules

[10 marks]

1. Define carbohydrates. Write the classification.
2. What are the various roles of carbohydrates?
3. Enlist the industrial and medical uses of carbohydrates?
4. Give the classification of amino acids.
5. What is an iso electric pH of an amino acid? What is its importance? Explain the titration curve of glycine.
6. Explain the structural organisation of proteins.
7. Write the classification of proteins.
8. Write the classification of lipids.
9. Give the classification of fatty acids.
10. Write in detail the structure of DNA.
11. What are the different types of RNA?

[5 marks]

1. Write a note on oligosaccharides.
2. What are polysaccharides? Give examples.
3. What is mutarotation? Give its practical approach.
4. What are the various chemical properties of amino acids?
5. Enlist the various functions of proteins.
6. What are lipids? Give examples.

7. Write the importance of lipids.
8. Write about the different types of lipoproteins.
9. Write about the packaging of DNA. Why packaging is needed?

[2 marks]
1. Define carbohydrates.
2. What are aldoses and ketoses sugar?
3. Define reducing sugar. Give examples.
4. Define non- reducing sugar. Give examples.
5. What are D and L isomers?
6. What are d and l isomers?
7. What is a racemic mixture?
8. Define epimers, giving examples.
9. What are alpha and beta anomers?
10. What is the importance of hyaluronic acid?
11. What is the use of dextran and dextrin?
12. What is the importance of inulin and heparin?
13. What are homopolysaccharides? Give examples.
14. What are heteropolysaccharides? Give examples.
15. What is amylose and amylopectin?
16. Give the structural detail of lactose and sucrose.
17. What is the basic structure of an amino acid?
18. What are essential amino acids? Give examples.
19. What is a D- and L- amino acid?
20. What is pI value of an amino acid?
21. How does pH affect the charge on an amino acid?
22. What are acidic amino acids? Write the structures.
23. Define lipids. Give examples.
24. Draw the structure and function of TAG.
25. What are the uses of phospholipids?
26. Define PUFA. Give examples.
27. Define essential fatty acids. Give examples.

Chapter: Cell and Transport Mechanism

[10 marks]
1. Give the differences between eukaryotes and prokaryotes.
2. Write the structural and functional details of mitochondria. Explain the symbiont hypothesis.
3. Write a note on fluid mosaic model of membrane. What is the importance of a membrane in a cell?
4. Draw a neat labelled diagram of a eukaryotic cell and write the functions of each labelled organelle.
5. Draw a neat labelled diagram of a prokaryotic cell and write the functions of each labelled organelle.
6. What are the various modes of transport within a cell? Explain in detail.

[5 marks]
1. Enlist the criteria for defining a cell.
2. Write the differences between plant and animal cell.
3. Give the structural and functional details of :

a. Nucleus
b. Endoplasmic reticulum
c. Mitochondria
d. Chloroplast
e. Vacuole and lysosome
f. Peroxisomes and glyoxisomes
g. Cell membrane
h. Prokaryotic and Eukaryotic cell wall
i. Golgi bodies

4.Write a note on symbiont theory of origin of mitochondria and chloroplast.
5. What is passive transport? Explain giving examples.
6. What is an active transport? Explain giving examples.

[2 marks]
1. Define cell and cytology.
2. What is the cell theory?
3. What is osmosis? Define hypertonic and hypotonic solutions.
4. What are centrioles and write their role in the cell.
5. Justify "mitochondrion is of maternal origin".
6. Define prokaryotes. Give examples.
7. Define eukaryotes. Give examples.
8. Why viruses and RBCs cannot be considered as true cells?
9. Why nucleus is called as the brain of a cell?
10. What gives a membrane selective permeability?
11. What is direct active transport? Give example.
12. What is indirect active transport? Give example.
13. What id facilitated diffusion? Give example.
14. Define symport, co transport and antiport transport of molecules.
15. Why lysosomes are called as suicidal bags of a cell and mitochondria as the power house?
16. What is the difference between R.E.R. and S.E.R.?

Chapter: Instruments Used in Biochemistry

[10 marks]
1. Write a note on colorimeter, including principle, types and uses.
2. Write a note on spectrophotometer, including principle, types and uses.
3. Write a note on centrifuge, including principle, types and uses.
4. Write a note on electrophoresis, including principle, types and uses.
5. Write a note on ultra centrifuge, including principle, types and uses.

[5 marks]
1. What are the differences between colorimeter and spectrophotometer?
2. Write the different uses of colorimeter and spectrophotometer.

[2 marks]
1. Which type of electrophoresis is used for isoenzyme separation?
2. Define Beer's and Lambert's law.
3. What is the principle of separation of components through centrifugation?

Chapter: Enzymes

[10 marks]
1. Write a note on the various enzyme classification systems.
2. Give the clinical importance of isoenzymes.
3. Describe in brief the various methods of enzyme inhibition.
4. Describe the structure and the mechanism of action of an enzyme.
5. Write about the various factors effecting enzyme activity.

[5 marks]
1. What is competitive inhibition? Give example.
2. What is uncompetitive inhibition? Give example.
3. What are enzymes? Give their structural details.

[2 marks]
1. Define enzymes. Give examples.
2. What are endoenzymes and exoenzymes?
3. Define Km value and give its importance.
4. Define katal, specific activity, turnover number and unit activity.
5. What are coenzymes? Give examples.
6. Define cofactors. Give examples.
7. What is absolute specificity and group specificity of an enzyme?
8. How does the pH and temperature affect the enzyme activity?
9. What are the isoenzyme forms of LDH? Write the clinical importance of them.
10. Which reactions are catalysed by SGOT and SGPT? Write about their clinical significance.
11. What happens in suicidal inhibition?

SECTION B

Chapter: Nutrition

[10 marks]
1. Write a note on free radicals and the damages caused by them.
2. What are the various roles of carbohydrates?
3. Enlist the industrial and medical uses of carbohydrates?
4. Write a note on vitamin A/D/E/K.
5. Write a note on vitamin B1.
6. Write a note on riboflavin.
7. Write a note on niacin.
8. Write a note on vitamin B6.
9. Write a note on biotin.

10. Write about the vitamin B12.
11. Write a note on vitamins as coenzymes.
12. Write a note on sodium as a mineral.
13. Calcium is an important mineral. Justify.
14. Write a note on iron as a mineral.
15. Write a note on heavy metals.
16. What are heavy metals? How these heavy metals are important for the various *Ayurvedic* preparations?

[5 marks]

1. How the various minerals are classified?
2. Enlist the various functions of sodium.
3. Write a note on chlorine as a mineral.
4. Enlist the factors affecting the absorption of calcium from the intestine.
5. What changes are seen upon calcium level in hyperparathyroidism?
6. Write a note on potassium as a mineral.
7. Write about the clinical conditions related to the iron levels in the serum.
8. Write a note in the magnesium as a mineral.
9. Enlist various functions of phosphorus in the body.
10. How do heavy metals harm our body?
11. How the absorption of heavy metals is dependent upon their chemical composition?
12. Write about pantothenic acid.
13. Write a note on folic acid.
14. What are the functions of vitamin C in our body?
15. Define vitamin. What are fat soluble vitamins? Describe their role.
16. What are the uses of vitamin A in our body?
17. Write a note on beri beri.
18. Write a note on scurvy and the measures taken to prevent it.
19. Write about the disease pellagra, the symptoms and the prevention criteria.
20. Write the importance of lipids.
21. Enlist the various functions of proteins.
22. What are antioxidants? How they beneficial for our body?

[2 marks]

1. Enlist the enzymes in our body which protect from free radicals.
2. Give the names of two natural and two artificial anti oxidants.
3. What are the uses of phospholipids?
4. What are the differences between vitamin A1 and vitamin A2?
5. Why fat soluble vitamins should be consumed within the RDA limits?
6. What is night blindness?
7. Why vitamin D is called as sunshine vitamin?

8. Enlist the functions of vitamin D.
9. Enlist the functions of vitamin E.
10. What are the three forms of vitamin K? Write their structures.
11. Why the deficiency of vitamin K is not so common?
12. What are the coenzyme forms of niacin, riboflavin, folic acid and pyridoxine?
13. Which vitamins have an antioxidant property? Enlist their role in the body.
14. Which coenzyme is used for the carboxylation processes and one carbon transfer?
15. What are the classical symptoms of riboflavin deficiency?
16. What happens when raw egg is consumed in large amounts?
17. What are the symptoms of hyper vitaminosis A?
18. What is hypernatremia and hyponatremia?
19. What is hyperchloremia and hypochloremia?
20. In which forms calcium is seen in the serum?
21. Which hormones regulate the concentration of calcium in the blood? What are their effects?
22. What is hypocalcemia and when it occurs?
23. What is hyperkalemia and hypokalemia?
24. Enlist the functions of potassium in our body.
25. What are the factors that affect the iron absorption?
26. Why iron is an essential element?
27. Why the concentration of iron in the body is maintained at the absorption level?
28. What is hypomagnesemia and hypermagnesemia?
29. Enlist the ways by which heavy metals can enter our body.
30. What is the mechanism of heavy metal toxicity?
31. What is acute and chronic heavy metal intoxication? Enlist few symptoms seen in both.

Chapter: Major Metabolic Pathways

[10 marks]

1. Write the pathway of

Glycolysis/ Gluconeogenesis / TCA / Hexose monophosphate shunt / Glycogenolysis / Glycogenesis / ETC

2. Write a note on urea cycle.
3. Write the steps of beta oxidation.
4. How fatty acid synthesis takes place?

[5 marks]

1. What is importance of

Glycolysis / Gluconeogenesis / TCA / Hexose monophosphate shunt / Glycogenolysis / Glycogenesis / ETC

2. Write a note on cori's cycle.
3. Explain the structure of F1- Fo ATP synthase and its mechanism of action.

[2 marks]

1. What is the importance of gluconeogenesis pathway?
2. What is the importance of cori's cycle?
3. Why ETC and oxidative phosphorylation process are called as coupled reactions?
4. What is oxidative phosphorylation? Where does it occur?
5. How much ATP is generated when one molecule of glucose is catabolised?
6. How much ATP is generated when an NADH is oxidized?
7. How much ATP is generated when one molecule of FADH2 is oxidized?
8. Name the pathway that generates five carbon sugars? Give the importance of that sugar.
9. What the importance of urea cycle in our body?
10. When does glycogenesis and glycogenolysis occur?

Chapter: Metabolism of xenobiotics

[10 marks]

1. What are xenobiotics? Write the phase I and phase II reactions.

[5 marks]

1. Write about the phase I reactions.
2. Write about the phase II reactions.

Chapter: Metabolic and Nutritional Diseases

[10 marks]

1. Write a note on diabetes mellitus.
2. Write a note on atherosclerosis.
3. Write a note on Kwashiorkor.
4. Write a note on marasmus.
5. Write a note on obesity.
6. Write a note on gout.

[5marks]

1. Enlist the precautions which should be taken in diabetes.

[2 marks]

1. Write the normal range of glucose in the blood.
2. What are the typical symptoms seen in diabetes.
3. What are the differences between type I and type II diabetes?
4. What are the physical problems which are seen in obese people?
5. Define endogenous and exogenous obesity.
6. Define hypertrophic and hyperplastic obesity.
7. What are the metabolic changes seen in obesity?
8. What is PEM? Name two diseases caused by it.