

St. Philomena's College (Autonomous), Mysore**PG Department of Biochemistry****Question Bank (Revised Curriculum 2018 onwards)****First Year- Second Semester (2019-20 Batch)****Course Title (Paper Title): Carbohydrate & Lipid Metabolism. QP Code: 54103**

Unit	Sl. No	Questions	Marks
1	1.	What is glucose paradox?	2
1	2.	Define anaplerotic reactions with an example.	2
1	3.	What is Amphibolic pathway? Give example.	2
1	4.	What are catabolic pathways? Give an example.	2
1	5.	What is glyoxylate cycle? Explain its significance.	2
1	6.	What is anaplerosis?	2
1	7.	Give the significance of glyoxylate pathway.	2
1	8.	How does cell synthesize glucose in absence of carbohydrate diet?	2
1	9.	Anabolism consumes energy. Justify the statement.	2
1	10.	What are futile cycles?	2
1	11.	Write the reactions of alcohol fermentation.	2
1	12.	Define gluconeogenesis	2
1	13.	How many molecules of ATP are produced during complete oxidation of one molecule of glucose?	2
1	14.	Mention the significance of PFK in glycolysis.	2
1	15.	Mention the fate of pyruvate under anaerobic condition.	2
1	16.	List out any two differences between oxidative and substrate level phosphorylation.	2
1	17.	Name the rate limiting enzymes of gluconeogenesis.	2
1	18.	Name the rate limiting enzymes of glycolysis.	2
2	19.	Name the precursor and role of UDP - GLC in the biosynthesis of polysaccharides.	2
2	20.	Name the carrier protein and the precursor required for glycogen synthesis.	2
3	21.	Mention the function of growth hormone in lipid metabolism.	2
3	22.	Mention the function of growth hormone in carbohydrate metabolism.	2
3	23.	Mention the function of thyroid hormone in carbohydrate metabolism.	2
3	24.	Mention the function of adrenaline in carbohydrate metabolism.	2
5	25.	Name the end product of β - oxidation of odd chain fatty acid metabolism.	2
5	26.	What are essential fatty acids? Give an example.	2
5	27.	What is β - oxidation?	2
5	28.	What is desaturation of fatty acids?	2
5	29.	What is Niemann - Pick disease?	2
5	30.	What are fatty acids? How are they synthesized?	2
5	31.	Why should the fatty acids be activated before undergoing catabolism?	2
5	32.	Illustrate β -Carbon of fatty acid.	2

5	33.	Name the enzymes which converts saturated fatty acids into unsaturated.	2
5	34.	Define carnitine shuttle.	2
5	35.	Indicate the role of carnitine in fatty acid oxidation.	2
5	36.	What is α -oxidation?	2
5	37.	Mention the role of carnitine in fatty acid oxidation.	2
5	38.	How many malonyl co-A molecules are required for synthesis of palmitate?	2
5	39.	How are triglycerides mobilized?	2
5	40.	Distinguish between ω -3 and ω -6 fatty acid.	2
5	41.	Differentiate between lipase and hormone sensitive lipase.	2
5	42.	Distinguish between ω -3 and ω -6 fatty acids with examples.	2
5	43.	Give the site of action of phospholipase A1, A2, C and D on phosphatidyl choline.	2
6	44.	What is reverse cholesterol transport?	2
6	45.	How is foam cells formed?	2
6	46.	What are foam cells? How are they formed?	2
6	47.	What is "bad" cholesterol? Why it's named so?	2
7	48.	Write the structure of cardiolipin.	2
7	49.	Write the structure of lecithin.	2
7	50.	Why are animal unable to convert fat to carbohydrates?	2
1	1.	Describe the oxidative phase of pentose phosphate pathway.	5
1	2.	Discuss the oxidation of glucose via pentose phosphate pathway and give its significance.	5
1	3.	Outline the sequence of reactions in anaerobic glycolysis with energetics.	5
1	4.	Give an account on entry of sugars into glycolytic pathway and give its significance.	5
1	5.	Explain the irreversible steps of gluconeogenesis.	5
1	6.	Give an account on the fate of pyruvate and acetyl CoA in Animals.	5
1	7.	Explain HMP pathway and mention its significance.	5
1	8.	Describe the steps of glyoxylate pathway.	5
1	9.	Explain the energetics of TCA cycle.	5
1	10.	Explain the role of citric acid cycle as a common oxidative pathway. Add a note on its regulation.	5
1	11.	How does TCA cycle differ from glyoxylate cycle?	5
1	12.	What is glyoxylate cycle? Explain its significance.	5
1	13.	Explain the fate of pyruvate and acetyl CoA in Animals.	5
1	14.	Explain glycolytic pathway.	5
1	15.	Explain the anaplerotic nature of TCA cycle.	5
1	16.	Write a note on significance and regulation of pentose phosphate pathway.	5
1	17.	How do sugars from glycogen and starch enter the glycolytic pathway?	5
1	18.	Explain how TCA cycle acts as a source of biosynthetic precursor and also	5

		an energy generating device.	
1	19.	What are oxidative and substrate level phosphorylation? Explain with example.	5
1	20.	How glucose is metabolized in glycolysis? Add a note on the significance of HMP shunt pathway.	5
1	21.	Compare and contrast between substrate level and oxidative phosphorylation.	5
1	22.	Give a detailed account on energetics of one molecule of Glucose on complete oxidation.	5
1	23.	Give an account on uptake and utilization of fructose.	5
1	24.	What is catabolism? Explain the different stages involved in breakdown of macromolecules	5
1	25.	With reactions explain the irreversible reactions of glycolysis	5
1	26.	Explain the fate of pyruvate in aerobic and anaerobic conditions.	5
1	27.	What is cori cycle? Give its significance	5
2	28.	Give an account on biosynthesis of glycogen.	5
2	29.	Explain in detail the regulation of glycogenesis and glycogenolysis in presence of glucagon.	5
2	30.	Outline the biosynthetic pathway of sucrose.	5
2	31.	Describe the pathway for biosynthesis of sucrose	5
2	32.	Describe the pathway for biosynthesis of starch.	5
2	33.	Describe the pathway for biosynthesis of glycogen.	5
2	34.	Explain the mechanism of biosynthesis of starch.	5
2	35.	Explain the biosynthesis of glycogen	5
3	36.	Give an account on role of insulin and glucagon on carbohydrate metabolism.	5
3	37.	Give an account on role of insulin and glucagon on lipid metabolism.	5
3	38.	Give an account on role of growth hormone & catecholamines on carbohydrate metabolism.	5
3	39.	Explain the role of thyroid hormone and corticosteroids on carbohydrate metabolism.	5
3	40.	Explain the effect of glucagon and thyroid hormone on glucose metabolism.	5
3	41.	Explain the Effect of hormones on lipid metabolism in liver	5
3	42.	Explain the Effect of hormones on lipid metabolism in adipose tissue	5
4	43.	Write short note on Diabetes Mellitus	5
4	44.	Discuss on diabetes mellitus and its classification.	5
4	45.	Explain the Metabolic changes in Diabetes Mellitus	5
5	46.	Explain Fatty acid synthetase complex	5
5	47.	Explain how palmitic acid undergoes β - oxidation.	5
5	48.	Schemate how linoleate gets converted to Arachidonate.	5
5	49.	Give the role of isomerases in the oxidation of unsaturated fatty acids.	5
5	50.	Explain Knoop's Experiment.	5
5	51.	Describe Fatty acid synthetase complex.	5
5	52.	Explain the role of carnitine in fatty acid metabolism.	5

5	53.	Give an account of the initiation of fatty acid biosynthesis by the FAS complex.	5
5	54.	Describe β - oxidation of fatty acids.	5
5	55.	Give a detailed account on energetics of one molecule of palmitoyl-COA on complete oxidation.	5
5	56.	Describe Schematic representation of two cycles of chain elongation and two cycles of desaturation of linoleic acid.	5
5	57.	Compare and contrast fatty acid oxidation and synthesis.	5
5	58.	Explain the energetics of biosynthesis of palmitic acid.	5
5	59.	Give an account on degradation of phospholipids	5
5	60.	Explain the degradation of phospholipids	5
5	61.	Give an account on degradation of sphingolipids.	5
5	62.	What is β -Oxidation? Explain the activation of fatty acids.	5
5	63.	Explain the conversion of ω -3 fatty acids into anti-inflammatory mediators	5
5	64.	Give the role of Hormone sensitive lipase and phospholipase in lipid metabolism	5
5	65.	Give the role of sphingomyelinase and Hormone sensitive lipase in lipid metabolism	5
5	66.	Explain the role of lipase and sphingomyelinase in lipid metabolism	5
5	67.	How does other sugars enter glycolytic pathway?	5
5	68.	Give an account on Knoop's Experiment	5
5	69.	What are saturated and unsaturated fatty acids? Give an example for each with structure.	5
5	70.	Explain the conversion of saturated fatty acids into unsaturated fatty acids.	5
6	71.	Write short note on Reverse cholesterol transport	5
6	72.	Describe the Conversion of HMG COA to squalene	5
6	73.	Explain the regulation and biosynthesis of cholesterol.	5
6	74.	Give an account on classification of lipoproteins.	5
6	75.	Explain the role of lipoproteins in transport of lipids.	5
6	76.	Explain Foam cell formation.	5
6	77.	Explain the metabolism of circulating lipids	5
6	78.	Explain the degradation of cholesterol.	5
6	79.	How does cholesterol biosynthesis regulated?	5
6	80.	Explain the mechanism of reverse cholesterol transport by HDL.	5
6	81.	Write short note on conversion of HMG-CoA upto Squalene	5
7	82.	Write the structure of Lecithin. Indicate site of action of different phospholipases.	5
7	83.	Explain the steps involved in degradation of sphingolipids.	5
7	84.	Explain the biosynthesis of sphingomyelin.	5
7	85.	Explain the biosynthesis of prostaglandin starting from Arachidonic acid.	5
7	86.	Give an account on Biosynthesis of Gangliosides.	5
7	87.	How does intermediate metabolic pathways are regulated?	5
7	88.	Give an account on Biosynthesis of cerebrosides.	5

7	89.	What are Eicosanoids? Explain their biological importance.	5
7	90.	How phospholipids are interconverted?	5
7	91.	Explain biosynthesis of sphingolipids.	5
7	92.	Explain the biosynthesis of prostaglandins.	5
7	93.	Describe the biosynthetic pathway of Thromboxanes.	5
7	94.	Explain the biosynthetic pathway of Leukotrienes.	5
7	95.	Schemate the biosynthetic pathway of Thromboxanes.	5
7	96.	Explain the denovo pathway of phospholipid biosynthesis	5
7	97.	Give an account on degradation of cerebrosides	5
7	98.	Explain the biosynthesis of cerebrosides	5
7	99.	How carbohydrate and lipid metabolism are integrated?	5
7	100.	How glycolipids are biosynthesized?	5
7	101.	What are etherlipids? Explain their biosynthesis	5

Question Paper Pattern- Model Question Paper

Q.P Code: 154103

St. Philomena's College (Autonomous) Mysore
B.Sc. II Semester C3 Component - Final Examination April - 2017

Subject: **BIOCHEMISTRY**

Title: **CARBOHYDRATE AND LIPID METABOLISM (HC)**

3 Hours

Max Marks: 70

PART -A

Answer any **TEN** of the following:

10x2=20

- What is glucose paradox?
- What is anaplerosis?
- Distinguish between W-3 and W-6 fatty acids with examples.
- What is reverse cholesterol transport?
- How is foam cells formed? -
- What is Amphibolic pathway? Give example.
- Differentiate between substrate level and oxidative phosphorylation.
- Give the site of action of phospholipase A₁, A₂, C and D on phosphatidyl choline.
- Explain the role of carnitine in fatty acid metabolism.
- What are Ketone bodies?
- What is Niemann - Pick disease?
- Write the structure of cardiolipin.

PART -B

Answer any **FIVE** of the following:

5x10=50

- Explain glycolytic pathway. 5
- Explain the anaplerotic nature of TCA cycle. 5
- Discuss diabetes mellitus and its classification. 5
- Explain the role of insulin and glucagon on carbohydrate metabolism 5
- Give an account on classification of lipoproteins. 5
- Explain the role of lipoproteins in transport of lipids.- 5
- Give a Schematic representation of two cycles of chain elongation and two cycles of desaturation of linoleic acid. 5
- Give an account of the initiation of fatty acid biosynthesis by the FAS complex. 5
- Describe β -oxidation of fatty acids. 5
- Give a detailed account on energetics of one molecule of palmitoyl-coA on complete oxidation. 5
- Describe the oxidative phase of pentose phosphate pathway. 5
- Write a note on significance and regulation of pentose phosphate pathway. 5
- What are eicosanoids? Explain their biological importance. 5
- Explain the biosynthesis of prostaglandin starting from Arachidonic acid. 5
