St. Philomena's College (Autonomous), Mysore

PG Department of Biochemistry

Question Bank (Revised Curriculum 2020-21 onwards)

First Year- First Semester (2020-21 Batch)

Course Title (Paper Title): Chemistry of Biomolecules (HC) QP Code - 84122

Sl. No	Unit	Questions	Marks
1	1	How does starch different from cellulose?	2
2	1	Mention the structural difference between lactose & maltose.	2
3	1	Mention the structural difference between sucrose & maltose.	2
4	1	Mention the structural difference between sucrose & lactose	2
5	1	Mention the structural difference between lactose & starch.	2
6	1	Why do animal store energy as glycogen?	2
7	1	What are xylans? How softwood xylans differ from hardwood xylans?	2
8	1	Mention the components of blood group polysaccharides.	2
9	1	Mention the components of bacterial cell wall polysaccharides.	2
10	1	What are mucopolysaccharides? Give an example.	2
11	1	Why sucrose is not a reducing sugar?	2
12	1	Write the open chain & Haworth structure of Fructose.	2
13	1	Write the open chain & Haworth structure of Glucose.	2
14	1	Write the open chain & Haworth structure of Galactose.	2
15	1	Write the open chain & Haworth structure of Ribose.	2
16	1	Write the Haworth structure of Maltose.	2
17	1	Write the Haworth structure of Lactose.	2
18	1	Write the Haworth structure of Sucrose.	2
19	1	What are amino sugars? Give an example.	2

20	1	Why Trehalose is not a reducing sugar?	2
21	2	Distinguish between N & O glycosylation.	2
22	2	What are Syndecan & Decorin?	2
23	2	What are Agreecan & Syndecan?	2
24	2	What are glycoproteins? Give an example	2
25	2	What are proteoglycans? Give an example	2
26	2	What are pectic Polysaccharides? Give an example.	2
27	2	Distinguish N & O linkage in Glycoproteins.	2
28	2	Write the action of periodic acid on glucose.	2
29	3	What are non-protein amino acids? Give an example.	2
30	3	What are unusual amino acids? How do they differ from non-protein amino acids?	2
31	3	Define Isoelectic point (pI). Calculate the pI of Isoleucine with pK_1=2.3 and pK_2=9.8.	2
32	3	How unusual amino acids differ from non protein amino acids? Give examples.	2
33	3	Enlist the properties of peptide bond.	2
34	3	Write the properties of peptide bond.	2
35	3	Write the zwitter ionic structure of lysine.	2
36	3	Write the zwitter ionic structure of Histidine.	2
37	3	Write the zwitter ionic structure of Tyrosine.	2
38	3	Write the zwitter ionic structure of glutamic acid.	2
39	3	Write the zwitter ionic structure of asparagine.	2
40	3	Enlist different sequencing methods of proteins.	2
41	3	Give the significance of London forces.	2
42	3	What is levinthal paradox?	2
43	3	What is denaturation of proteins?	2

44	3	Give the significance of Ramchandran Plot.	2
45	3	List out the non-covalent forces stabilizing the structure of proteins.	2
46	3	What is glutathione? Give its structure with importance.	2
47	3	Write the structure & biological importance of Glutathione.	2
48	3	Write the structure & biological importance of Enkaphalins.	2
49	3	Give an example with importance of endorphins.	2
50	3	Mention the weak forces involved in stabilization of protein structure.	2
51	3	What is Levinthal paradox? Give its significance.	2
52	3	What are endorphins? Give its biological function.	2
53	3	Name the torsion angles seen in proteins. Highlight its importance in protein folding.	2
54	3	What are polyglycine helices? Give its biological significances.	2
55	3	What is a Rossman fold?	2
56	3	Give the role of hydroxylycine and hydroxyproline in collagen.	2
57	3	Highlight the importance of proximal and distal histidine in hemoglobin.	2
58	4	What are essential fatty acids? Give an example.	2
59	4	Unsaturated fatty acids are nutritionally better than its saturated counterpart. Why?	2
60	4	Differentiate between waxes and oils.	2
61	4	What are waxes? Give an example.	2
62	4	Name & give the importance of Essential fatty acids.	2
63	4	Write the structure of cardiolipins.	2
64	4	Write the structure of plasmalogens.	2
65	4	Mention the importance of sphingolipids.	2
66	4	Write the structure of Lecithin.	2
67	4	How gangliosides differ from cerebrosides?	2
68	4	Write the function of Leukotrienes.	2

69	4	Write the function of Prostaglandins.	2
70	4	Write the function of Prostacyclins.	2
71	4	Write the function of Thromboxanes.	2
72	4	What are DAG & PAF? Give their role.	2
73	4	What is PAF? Give its biological significance.	2
74	4	What are prostaglandins? What are the precursors required for their synthesis.	2
75	4	What is saponification number? Give an example.	2
76	5	What is Tm Value? List the factors affecting it.	2
77	5	Define Tm Value. Name the factors affecting Tm.	2
78	5	How Z-DNA differs from B-DNA?	2
79	5	Distinguish between B-DNA & Z-DNA.	2
80	5	State Chargaff's rule.	2
81	5	Define Chargaff rule.	2
82	5	What is cot curve? Give its significance.	2
83	5	Define T_m value. Name the factors affecting T_m.	2
84	5	What are palindromic sequences?	2
85	5	Give the principle behind ethanol precipitation used in DNA extraction.	2
86	5	What are palidromic sequences? Give an example.	2
87	5	What is pyrosequencing?	2
1	1	Describe the classification of carbohydrates with examples.	5
2	1	What are mucopolysaccharides? Write the structure & functions of chondritin sulfate.	5
3	1	Write the structure, importance of Hyarulonic acid & lactose.	5
4	1	Explain bacterial cell wall polysaccharides.	5
5	1	Write short note on blood group polysaccharides.	5

6	1	Write short note on bacterial cell wall polysaccharides.	5
7	1	Write a note on linkages in lactose, sucrose & Maltose. Why are lactose & maltose are reducing sugars where as sucrose is not?	
8	2	Explain acid hydrolysis and periodate oxidation of carbohydrates.	5
9	2	Explain the structural differences between N and O-linked glycoproteins. Add a note on lectins.	5
10	2	What are glycosaminoglycans & proteoglycans? Explain its biological significance with examples.	5
11	2	How is periodate oxidation useful in determining the structure of carbohydrates?	5
12	3	Give an account on the general reactions of amino acids.	5
13	3	Explain the classification of amino acids based on their R-group.	5
14	3	Describe the synthesis and biological function of glutathione.	5
15	3	Explain the steps involved in solid phase synthesis of a peptide.	5
16	3	Write a note on types of interactions seen in tertiary structure.	5
17	3	What are secondary structures of a protein? Explain alpha-helical structure in detail.	5
18	3	Explain the steps involved in determination of glycosylation site in a protein.	5
19	3	Describe the methods involved in determination of amino acid composition.	5
20	3	How is the amino acid composition of a protein determined?	5
21	3	What are the steps involved in determining the sequence of a polypeptide chain.	5
22	3	Describe the 3D structure of Collagen.	5
23	3	Describe the 3D structure of Hemoglobin.	5
24	3	Describe the 3D structure of Myoglobin.	5
25	3	Describe the 3D structure of Keratin.	5
26	3	Describe the 3D structure of Immunoglobulin.	5
27	3	Describe how purity of a protein is established in a laboratory?	5

28	3	Explain Ramachandran plot.	5
29	3	Discuss on Ramachandran plot.	5
30	3	Explain how Ramachandran's plot is useful in determining the secondary structure of a protein.	5
31	3	Write a note on non-covalent forces stabilizing secondary structure of proteins.	5
32	3	Write a note on Merrifield's Solid phase peptide synthesis.	5
33	3	Write a note on Khorana's Solution phase peptide synthesis.	5
34	3	Describe Khorana's Solution phase peptide synthesis.	5
35	3	Write a note on determination of N-&C-terminal amino acid of a peptide.	5
36	3	How N- & C- terminal amino acids are identified?	5
37	3	Give an account on isolation & purification of proteins.	5
38	3	Give an account on purity of proteins.	5
39	3	Explain sold phase synthesis of peptides.	5
40	3	Write the tertiary structure of Hemoglobin.	5
41	3	Elaborate on the 3D structure of Immunoglobulin.	5
42	3	Outline the strategies for protein sequencing.	5
43	3	Discuss on identification of 'N'& 'C' terminal amino acids.	5
44	3	Explain Anfinsen's experiment on denaturation & renaturation of proteins.	5
45	3	Write note on non-covalent forces stabilizing protein secondary structure.	5
46	3	Explain the secondary structures of proteins.	5
47	3	Explain Anfinsen's experiment on renaturation of proteins.	5
48	3	Write a note on automated Sequanators.	5
49	4	How lipids are classified? Explain with an example.	5
50	4	Give the classification of lipids with suitable examples.	5
51	4	Write a note on structure and biological importance of gangliosides.	5
52	4	Write a note on structure and biological importance of sphingolipids.	5

53	4	What are eicosanoids? Explain the structure & functions of Thromboxanes.	5
54	4	Explain the structure of phosphotidyl Choline & Sphingomyelin.	5
55	4	Discuss the structure and biological function of platelet activating factor and ceramide.	5
56	4	Write note on lipid mediators.	5
57	4	Write the structure & functions of PAF.	5
58	4	Write the structure & functions of DAG.	5
59	4	What are phospholipids? Explain its classification with suitable examples.	5
60	4	What are eicosanoids? Explain their biological significance.	5
61	5	Explain the steps involved in extraction and purification of DNA from a bacterial source.	5
62	5	What is a Cot curve? Give the classification of DNA based on Cot curve.	5
63	5	Explain Clover Leaf Model of t-RNA.	5
64	5	Describe the Sanger's Dideoxy method of DNA sequencing.	5
65	5	Describe the Watson & crick model of DNA structure.	5
66	5	Describe Sanger's Dideoxy method of DNA sequencing.	5
67	5	Write short note on Clover leaf model of t-RNA.	5
68	5	Explain Maxam-Gilbert method of DNA sequencing.	5
69	5	Explain the Watson & crick model of DNA structure.	5
70	5	Explain the chemical reactions o DNA & RNA.	5
71	5	Write short note on isolation of DNA & RNA from animal cells.	5
72	5	Explain the methods of isolation of DNA from microbial source.	5
73	5	Explain the isolation of RNA from biological source.	5
74	5	Discuss the secondary structure of t-RNA.	5
75	5	Explain the different forms of DNA.	5
76	5	Discuss the Maxam-Gilbert method of DNA sequencing.	5
77	5	Write short note on secondary structure of DNA.	5

1	1	Discuss on classification of carbohydrates. Add a note on Bacterial cell wall polysaccharides.	10
2	1	What are amino sugars? Explain the structure, importance of Chitin, Neuraminic Acid and Chondroitin Sulphate.	10
3	1	Explain bacterial cell wall & blood group polysaccharides.	10
4	2	Explain different methods involved in structural elucidation of carbohydrates.	10
5	2	Explain how periodate oxidation and Graded Acid Hydrolysis methods are useful in determining the structure of carbohydrates?	10
6	3	Describe the secondary structure of alpha keratin and tertiary structure of myoglobin.	10
7	3	Explain Edward method and Dansyl chloride method of protein sequencing.	10
8	3	Write short note on general reactions of amino acids with suitable example.	10
9	3	Explain the properties of peptide bond. Add a note on structure & biological importance of Glutathione.	10
10	3	Explain the synthesis, biological importance of Glutathione & endorphins.	10
11	3	What are peptides? Explain the structure & biological importance of any two naturally occurring peptides.	10
12	3	Explain the different methods involved in chemical synthesis of peptides.	10
13	3	Describe the methods involved in determination of amino acid composition.	10
14	3	How is the amino acid composition of a protein determined?	10
15	3	Outline the strategies for protein sequencing.	10
16	3	Explain the different methods involved in determining primary structure of amino acids.	10
17	3	Explain different level of structural organization of proteins with suitable example.	10
18	3	Write note on level of structural organization of proteins.	10
19	3	Describe the secondary structure of proteins with suitable example.	10

20	3	Explain Ramachandran plot. Add a note on quaternary structure of protein.	10
21	3	Write a note on tertiary structure of proteins. Add a note on types of interactions seen in tertiary structure.	10
22	3	Explain 3D structure of collagen and Myoglobin.	10
23	3	Explain 3D structure of Keratin and Myoglobin.	10
24	3	Explain 3D structure of collagen and Hemoglobin.	10
25	3	Explain 3D structure of Keratin and immunoglobulin.	10
26	4	What are phospholipids? Give a detailed note on its types and biological importance.	10
27	4	What are glycolipids & phospholipids? Give a detailed note on its types and biological importance.	10
28	4	Elaborate on classification of lipids with suitable example & structures.	10
29	4	Elaborate on types & biological importance of phospholipids.	10
30	4	What are eicosanoids? Explain the structure & biological importance of Leukotrienes.	10
31	4	Explain the structure, biological importance of Leukotrienes & Thromboxanes.	10
32	4	Write an explanatory note on lipid mediators.	10
33	5	Explain the isolation & Purification of DNA from animal source.	10
34	5	Explain the isolation & Purification of RNA from plant source.	10
35	5	Write a note on physiochemical properties of nucleic acids.	10
36	5	Explain the chemical reactions of DNA & RNA.	10
37	5	Explain the secondary structures of DNA. Add a note on Watson & crick model.	10
38	5	Comment on Dideoxy Method & Maxam-Gilbert Method of DNA sequencing.	10
39	5	Explain Maxam-Gilbert Method and Dideoxy Method of DNA sequencing.	10
40	5	Explain Maxam-Gilbert & pyrosequencing method of DNA sequencing	10

41	5	Comment on Secondary Structural Features of DNA.	10
42	5	Explain Watson crick model of DNA & clover leaf model of t-RNA.	10

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Model Question Paper

St. Philomena's College (Autonomous), Mysore

I Semester M.Sc-Final Examination

Subject: Biochemistry

Title: Chemistry of Biomolecules (HC)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer any TEN of the following:			**10x2=20**
1.		Mention the structural difference between lactose & starch.	**2**
2.		Why do animal store energy as glycogen?	**2**
3.		Why Trehalose is not a reducing sugar?	**2**
4.		What are Agreecan & Syndecan?	**2**
5.		What are glycoproteins? Give an example	**2**
6.		Write the zwitter ionic structure of Histidine.	**2**
7.		Define Isoelectic point (pI). Calculate the pI of Isoleucine with pK_1=2.3 and pK_2=9.8.	**2**
8.		How unusual amino acids differ from non protein amino acids? Give examples.	**2**
9.		Name & give the importance of Essential fatty acids.	**2**
10.		Write the structure of cardiolipins.	**2**
11.		Define Chargaff rule.	**2**
12.		What is cot curve? Give its significance.	**2**

PART-B

Answer any SIX questions:			**6x5=30**
13.		Write a note on linkages in lactose, sucrose & Maltose. Why are lactose & maltose are reducing sugars where as sucrose is not?	**5**
14.		Explain acid hydrolysis and periodate oxidation of carbohydrates.	**5**
15.		Explain the classification of amino acids based on their R-group.	**5**
16.		Describe the 3D structure of Immunoglobulin.	**5**
17.		Explain the structure of phosphotidyl Choline & Sphingomyelin.	**5**
18.		What are eicosanoids? Explain their biological significance.	**5**
19.		Describe the Watson & crick model of DNA structure	**5**
20.		Describe Sanger's Dideoxy method of DNA sequencing.	**5**
		PART-C	
Answer any TWO questions:			**2x10=20**
21.		What are amino sugars? Explain the structure, importance of Chitin, Neuraminic Acid and Chondroitin Sulphate.	**10**
22.		Explain the different methods involved in chemical synthesis of peptides	**10**
23.		What are phospholipids? Give a detailed note on its types and biological importance.	**10**

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