St. Philomena's College (Autonomous), Mysore			
PG Department of Biochemistry			
Question Bank {Revised Curriculum (LOCF) - 2020-22 Batch }			
Second Year- Third Semester			
Course Title (Paper Title): Nitrogen Metabolism (HC)			**QP Code: 84321**
Sl. No	**Unit**	**Questions**	**Marks**
1	1	Give the significance of nitrogen in biological systems	2
2	1	What is decay?	2
3	1	What is nitrification?	2
4	1	What is denitrification?	2
5	1	What is industrial nitrogen fixation?	2
6	1	What is atmospheric nitrogen fixation?	2
7	1	What is biological nitrogen fixation?	2
8	1	What is anamox?	2
9	1	How are ammonia and nitrates assimilated?	2
10	1	Distinguish between symbiotic and non symbiotic nitrogen fixation.	2
11	1	What is the role of nitrogenase complex?	2
12	1	How is nitrogenase complex regulated?	2
13	1	What is atmospheric nitrogen fixation?	2
14	1	What is nod factor? Give its significance	2
15	1	What are bacteroids? How are they formed?	2
16	1	What is leghemoglobin? Give its importance	2
17	2	What are the Cellular functions of protein degradation?	2
18	2	What is the significance of protein degradation?	2
19	2	Explain proteolysis	2
20	2	What are the chemical changes which lead to protein degradation?	2
21	2	What is chemical aging?	2
22	2	How does ROS lead to protein degradation?	2
23	2	Write a short note on protein turn over	2
24	2	Which are the Proteases involved in Protein Turnover?	2
25	2	Which are the Enzymes involved in the process of Ubiquitination?	2
26	2	Write the Structure of proteosome	2
27	2	Write a short note on lysosomal protein degradation	2
28	2	What are Glycoproteins? Give their biological significance	2
29	2	How are O linked glycoproteins biosynthesized?	2
30	2	What are the functions of GPI linkages? Give its structure	2
31	2	How is dolichol phosphate formed?	2
32	2	What are proteoglycans? Give their biological significance	2
33	2	Comment on the Modules of nonribosomal peptide synthetases	2
34	2	Give the structure and functions of Heme	2
35	2	Comment on the rate limiting step in hepatic heme synthesis	2
36	2	What are the reasons behind hyperbilirubinemia?	2
37	2	How and where is Creatinine biosynthesized in our body?	2
38	3	What are transamination reactions? Explain with an example	2
39	3	What is the role of pyridoxal phosphate in transamination reaction?	2
40	3	What is SGOT? Give its significance	2
41	3	What is SGPT? Give its significance	2

42	3	What is oxidative deamination of amino acids? Explain with an example	2
43	3	What is non oxidative deamination of amino acids? Explain with an example	2
44	3	Give the metabolic significance of GDH and glutamate	2
45	3	What is transdeamination of amino acids? Give example	2
46	3	What is decarboxylation of amino acids? Give example	2
47	3	What is desulfuration of amino acids? Give example	2
48	3	What are glucogenic and ketogenic amino acids? Give examples	2
49	3	How is chorismate synthesized from shikimate?	2
50	4	What is feedback inhibition? Give example	2
51	4	What is concerted inhibition? Give example	2
52	4	What is enzyme multiplicity? Give example	2
53	4	What is sequential feedback inhibition? Give Example	2
54	4	What is the role of Transglutaminase?	2
55	4	How does Glutamate dehydrogenase regulate urea cycle?	2
56	4	How does ammonia enter urea cycle? Give the reaction	2
57	4	What causes Alkaptonuria?	2
58	4	What causes Maple syrup urine disease? Explain	2
59	4	What causes phenylketonuria?	2
60	5	What are nucleotides and nucleosides? Give examples	2
61	5	Give the sources of atoms in purine rings with structure	2
62	5	Give the sources of atoms in pyrimidine rings with structure	2
63	5	What is the significance of cAMP? Give its structure	2
64	5	What is the significance of ATP?Give its structure	2
65	5	How is the conversion of IMP to other nucleotides regulated?	2
66	5	Write the reactions which involves xanthine oxidase	2
67	5	What is primary gout? Give the associated complications	2
68	5	What is secondary gout? Give the associated complications	2
69	5	What is the significance of Allopurinol?	2
70	5	What is Pseudogout? Give the associated complications	2
71	5	What is HGPRT? Give its significance.	2
72	5	How are Nucleotides converted to Deoxynuclotides?	2
73	5	Write a note on the action of methotrexate.	2
74	6	Give the structure Of NAD+. Add a note on its biological significance	2
75	6	Give the structure Of FAD. Add a note on its biological significance	2
76	6	Give the structure Of Coenzyme A. Add a note on its biological significance	2
77	6	What are Polyamines? Give examples and their biological significance.	2
78	7	What is transpiration? Give its significance.	2
79	7	What are antitranspirants? Give examples.	2
80	7	Define photosynthesis? Give its biological significance.	2
81	7	Why do plants appear green in colour?	2
82	7	What are plastids? Give its types.	2
83	7	Write a neat labelled diagram of chloroplasts.	2
84	7	What is chemiosmosis? Give its significance.	2
85	7	What is cuticular transpiration? Give its biological significance.	2
86	7	What is lenticular transpiration? Give its biological significance.	2
87	7	What is stomatal transpiration? Give its biological significance.	2

88	7	Distinguish between evaporation and transpiration.	2
89	7	Which are the different phases of photosynthesis? Give their significance.	2
90	7	What are thylakoids? Give their biological significance.	2
91	7	What is stroma? Give its biological significance.	2
92	7	What is PSI? What are its components?	2
93	7	What is PSII? What are its components?	2
94	7	What is Photolysis?	2
95	7	What is cyclic photophosphorylation?	2
96	7	What is non-cyclic photophosphorylation?	2
97	7	What is red drop?	2
98	7	What is emersion effect?	2
99	7	What is light harvesting system?	2
100	7	What is the biological significance of reaction center in Photosystems	2
101	7	How does an antenna complex work?	2
102	7	What is the Z-scheme of photosynthesis?	2
103	7	What is photorespiration?	2
104	7	What is RUBISCO? Give its biological significance.	2
105	7	What is Calvin cycle? Give its significance.	2
106	7	What is c4 cycle? Give its significance.	2
107	7	Give the reaction which leads to the formation of oxaloacetic acid in HSK pathway.	2
108	7	Give the reaction which leads to the formation of malic acid in HSK pathway.	2
109	7	Give the reaction which leads to the formation of aspartic acid in HSK pathway.	2
110	7	Give the reaction which leads to the formation of pyruvic acid in HSK pathway.	2
111	7	What is acidification in CAM pathway?	2
112	7	What is deacidification in CAM pathway?	2
113	7	What is CAM pathway ? Give its biological significance.	2
114	7	What are plant growth regulators? Give the names of important regulators.	2
115	7	What are natural plant hormones? Give examples.	2
116	7	What are synthetic plant hormones? Give examples.	2
117	7	What are Plant growth promoters? Give examples.	2
118	7	What are Plant growth retarders? Give examples.	2
119	7	What are Auxins? Give their biological significance.	2
120	7	What are cytokinins? Give their biological significance.	2
121	7	What are gibberellins? Give their biological significance.	2
122	7	What is absicic acid? Give its biological significance.	2
123	7	What is ethylene? Give its biological significance.	2
124	7	What is a pathogen? Which are the two types of responses observed with their host interaction?	2
125	7	What are pathogens? Give the classes of plant pathogens with examples.	2
126	7	Which are the two defensive mechanisms of plants against pathogens?	2
127	7	What are elicitors of defence response? Give its types with examples.	2
128	7	What is induced defence? Give its types.	2

129	7	What are hypersensitive responses of plant defence? Give examples.	2
130	7	What is systemic acquired resistance? Give its significance.	2
131	7	What is pathogen related proteins? Give their significance.	2
132	7	What are secondary metabolites? Give its role in defence with an example.	2
133	7	What is communal resistance? Give example.	2
1	1	Explain briefly the nitrogen cycle.	5
2	1	Briefly explain the role of nitrogenase complex in fixing atmospheric nitrogen along with its regulation and energetics.	5
3	1	Give a detailed account on the root nodule formation in leguminous plants.	5
4	2	Discuss the cellular functions of protein degradation and criterias for protein degradation.	5
5	2	Explain Ubiquitin-Proteosome Pathway of protein degradation.	5
6	2	Explain lysosomal pathway of protein degradation.	5
7	2	Explain the Biosynthesis Of N linked Glycoproteins	5
8	2	Discuss Glycoprotein ERAD functioning.	5
9	2	Give a detailed account on lysosomal catabolism of glycoproteins.	5
10	2	Explain the Biosynthesis Of O linked Glycoproteins.	5
11	2	Give the biosynthetic pathway for keratin sulfate.	5
12	2	Give the biosynthetic pathway for Chondroitin sulfate.	5
13	2	Give the biosynthetic pathway for heparin sulfate.	5
14	2	Discuss on Proteoglycans degradation.	5
15	2	Explain the Non Ribosomal Peptide Synthesis of Glutathione.	5
16	2	Explain the Non Ribosomal Peptide Synthesis of Gramicidine.	5
17	2	Give a detailed account on Biosynthesis Of Heme And Porphyrins.	5
18	2	Give a detailed account on Degradation Of Heme And Porphyrins.	5
19	2	Comment on the Biosynthesis Of Creatine.	5
20	3	Briefly explain the General Mechanisms Of Amino Acid Metabolism.	5
21	3	Write the biosynthetic pathway for Glutamine	5
22	3	Write the biosynthetic pathway for Proline	5
23	3	Write the biosynthetic pathway for Arginine	5
24	3	Write the biosynthetic pathway for Glycine	5
25	3	Write the biosynthetic pathway for Serine	5
26	3	Write the biosynthetic pathway for Threonine	5
27	3	Write the biosynthetic pathway for Aspartate	5
28	3	Write the biosynthetic pathway for Asparagine	5
29	3	Write the biosynthetic pathway for Alanine	5
30	3	Write the biosynthetic pathway for Valine	5
31	3	Write the biosynthetic pathway for Leucine	5
32	3	Write the biosynthetic pathway for Isoleucine	5
33	3	Write the biosynthetic pathway for Tryptophan	5
34	3	Write the biosynthetic pathway for Phenlyalanine	5
35	3	Write the biosynthetic pathway for Tyrosine	5
36	3	Write the biosynthetic pathway for Histidine	5
37	3	Give the degradative pathway for Glutamine	5
38	3	Give the degradative pathway for Proline	5
39	3	Give the degradative pathway for Arginine	5

40	3	Give the degradative pathway for Glycine	5
41	3	Give the degradative pathway for Serine	5
42	3	Give the degradative pathway for Threonine	5
43	3	Give the degradative pathway for Aspartate	5
44	3	Give the degradative pathway for Asparagine	5
45	3	Give the degradative pathway for Alanine	5
46	3	Give the degradative pathway for Lysine	5
47	3	Give the degradative pathway for Alanine	5
48	3	Give the degradative pathway for Valine	5
49	3	Give the degradative pathway for Leucine	5
50	3	Give the degradative pathway for Isoleucine	5
51	3	Give the degradative pathway for Tryptophan	5
52	3	Give the degradative pathway for Phenlyalanine	5
53	3	Give the degradative pathway for Tyrosine	5
54	3	Give the degradative pathway for Histidine	5
55	4	Summarise the regulation of amino acid biosynthesis	5
56	4	Explain Transglutaminase Cycle. Give its significance	5
57	4	Give a detailed account on urea cycle.	5
58	4	Explain the complications in Phenylketonuria along with symptoms and treatment	5
59	4	Explain the complications associated with Maple syrup urine disease and add a note on its symptoms and treatment	5
60	4	Explain the complications associated with Alkaptonuria. Add a note on its symptoms and treatment	5
61	5	Give a detailed account on salvaging of purines and pyrimidines	5
62	5	De Novo Biosynthetic Pathways For Purines	5
63	5	De Novo Biosynthetic Pathways For Pyrimidine	5
64	5	Comment on the degradation of Purines	5
65	5	Comment on the degradation of Pyrimidine	5
66	5	Give a detailed account on gout	5
67	5	Give a detailed account on Lysch-Nyhan Syndrome	5
68	6	Briefly explain the biosynthesis Of NAD+. Add a note on its biological significance	5
69	6	Briefly explain the biosynthesis Of FAD. Add a note on its biological significance	5
70	6	Briefly explain the biosynthesis Of Coenzyme A. Add a note on its biological significance	5
71	6	Describe the biosynthetic pathway of spermine. Add a note on its biological significance and its regulation	5
72	6	Describe the biosynthetic pathway of spermidine. Add a note on its biological significance and its regulation	5
73	7	What is transpiration? Explain its types and the external cues affecting transpiration and add a note on antitranspirants.	5
74	7	Explain the mechanism of action of Auxins.	5
75	7	Explain the mechanism of action of Gibberlins.	5
76	7	Explain the mechanism of action of Cytokinins.	5
77	7	Explain the mechanism of action of Ethylene.	5
78	7	Explain the mechanism of action of Abscisic acid.	5
79	7	Explain C4 cycle.	5

80	7	Give a detailed account on C2 cycle.	5
81	7	Explain CAM cycle.	5
82	7	Give a detailed account on C3 cycle.	5
83	7	Explain cyclic photophosphorylation with a neat labelled diagram of respective photo system.	5
84	7	Explain non-cyclic photophosphorylation with a neat labelled diagram of respective photo system.	5
85	7	Describe the plant defensive mechanisms against pathogens.	5
86	7	Give a detailed account on different types of plant pathogen interactions. Add a note on any two types of defensive mechanisms exhibited by plants.	5
1	1	Briefly explain the role of nitrogenase complex in fixing atmospheric nitrogen along with its regulation and energetics detailed account. Add a note on the root nodule formation in leguminous plants.	10
2	2	Explain Ubiquitin-Proteosome and lysosomal pathways of protein degradation.	10
3	2	Explain the Biosynthesis and degradation Of N linked Glycoproteins.	10
4		Explain the Biosynthesis and degradation Of O linked Glycoproteins.	10
5	2	Discuss on the biosynthesis and degradation of Proteoglycans with an example.	10
6	2	Give a detailed account on Biosynthesis and degradation of Heme And Porphyrins.	10
7	3	Give the Biosynthetic pathway for Lysine	10
8	3	Give the Biosynthetic pathway for Methionine	10
9	3	Give the Biosynthetic pathway for Leucine	10
10	3	Give the Biosynthetic pathway for Tryptophan	10
11	3	Give the Biosynthetic pathway for Tyrosine	10
12	3	Give the Biosynthetic pathway for Phenylalanine	10
13	3	Give the Biosynthetic pathway for Histidine	10
14	4	Explain the complications associated with phenylketonuria and Alkaptonuria. Add a note on their symptoms and treatment	10
15	4	Explain the complications associated with Maple syrup urine disease and Alkaptonuria. Add a note on their symptoms and treatment	10
16	5	Give a detailed account on gout and Lysch-Nyhan Syndrome.	10
17	5	Give a detailed account on denovo synthesis and salvaging of purines.	10
18	5	Give a detailed account on denovo synthesis and salvaging of pyrimidines.	10
19	5	Give a detailed account on degradation and salvaging of purines.	10
20	5	Give a detailed account on degradation and salvaging of pyrimidines.	10
21	6	Briefly explain the biosynthesis Of NAD+ and FAD.	10
22	6	Describe the biosynthetic pathways of spermine and spermidine. Add a note on their biological significance and regulation	10
23	7	What are plant hormones? Give its classification. Explain the five natural plant hormones with their biological significance.	10
24	7	Give a detailed account on different types of plant pathogen interaction and defensive mechanisms.	10
25	7	Explain the light and dark reactions of Photosynthesis with a neat labelled diagram of photosynthetic apparatus and Photosystems.	10

26	7	Give the physiological action and mechanism of action of Auxins, Gibberlins.	10
27	7	Give the physiological action and mechanism of action of Auxins, Ethylene.	10
28	7	Give the physiological action and mechanism of action of Cytokinins, , Abscisic acid.	10
29	7	Explain C4 and CAM cycle. Add a note on the significant differences between them.	10
30	7	Give a detailed account on C2 and C3 cycle.	10
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Model Question Paper			
St. Philomena's College (Autonomous), Mysore			
III Semester M.Sc-Final Examination			
Subject: Biochemistry			
Title: Nitrogen Metabolism (HC)			
Time: 3 Hours			**Max Marks: 70**
PART-A			
Answer any TEN of the following:			**10x2=20**
1.		Distinguish between Glucogenic and Ketogenic amino acids with examples.	**2**
2.		Give the biological significance of SGOT and SGPT.	**2**
3.		Give an example for deamination of amino acids.	**2**
4.		Write the structure of two aromatic amino acids.	**2**
5.		How does PLP help in transamination reactions? Explain.	**2**
6.		Give an example for decarboxylation of amino acids.	**2**
7.		Give the list of precursors and its amino acids.	**2**
8.		What are pathogens? Give the classes of plant pathogens with examples.	**2**
9.		What is the significance of ATP?Give its structure	**2**
10.		What is CAM pathway? Give its biological significance.	**2**
11.		What are gibberellins? Give their biological significance.	**2**
12.		What is the Z-scheme of photosynthesis?	**2**
PART-B			
Answer any SIX questions:			**6x5=30**
13.		Explain the biological importance of glutamate dehydrogenase and transglutaminase cycle.	**5**
14.		Give a detailed account on the steps involved in biosynthesis of valine.	**5**
15.		Briefly explain the steps involved in glycine biosynthesis.	**5**
16.		Explain the different types of regulation in amino acid biosynthesis.	**5**
17.		Give the biosynthetic steps for arginine.	**5**
18.		Explain the mechanism of action of Auxins.	**5**
19.		Give a detailed account on urea cycle.	**5**
20.		De Novo Biosynthetic Pathways For Pyrimidine.	**5**
		PART-C	
Answer any TWO questions:			**2x10=20**
21.		Give a detailed account on biosynthesis of tryptophan.	**10**
22.		Explain the biosynthesis of histidine.	**10**
23.		Explain the light and dark reactions of Photosynthesis with a neat labelled diagram of photosynthetic apparatus and Photosystems.	**10**

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