

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): Molecular Biology. QP Code:54102**

UNIT	SI. NO	Questions	Marks
1	1	Highlight the contribution of Rosalind Franklin to field of Molecular Biology.	2
1	2	Differentiate between nucleotides and nucleosides.	2
1	3	When DNA molecule is subjected to agarose gel electrophoresis it moves towards anode. Why?	2
1	4	Give the composition of DNA.	2
1	5	Comment on the use of isopropanol in DNA purification.	2
1	6	Isolation of DNA from plant source is more tedious than from animal source. Why?	2
1	7	What is sugar pucker?	2
1	8	Differentiate between A and Z DNA.	2
1	9	When the relative humidity is approximately 75%, which form does a DNA molecule assume?	2
1	10	What is Hoogsteen base pair? Give its significance.	2
1	11	What is Chargaff's rule? Give its significance.	2
1	12	What are the outcomes of Hershey and Chase experiment?	2
1	13	State the central dogma of Molecular Biology.	2
1	14	What is a transforming principle?	2
1	15	Name any two viruses containing RNA as genetic material.	2
2	16	What are catenanes?	2
2	17	What are Okazaki fragments?	2
2	18	Define the role Sec A protein in DNA replication.	2
2	19	How hemimethylation prevents initiation of DNA replication at same origin?	2
2	20	What is dispersive replication?	2
2	21	Differentiate between conservative and semi conservative mode of replication.	2
2	22	What is Klenow fragment? Mention its significance.	2
2	23	What are topoisomerases?	2
2	24	Define linking number.	2

2	25	Differentiate between negative supercoiling and positive supercoiling.	2
2	26	What are DNA gyrases? Comment on its role in DNA replication.	2
2	27	What is a clamp loader?	2
2	28	Highlight the importance of magnesium ion in DNA replication.	2
2	29	Give the importance of topoisomerase inhibitors in treatment of cancer.	2
2	30	What is a replication fork?	2
2	31	What is translesion DNA synthesis? Give its significance	2
2	32	What is 'D' loop? Mention its significance.	2
3	33	Are genes and proteins collinear? Comment.	2
3	34	What is cordycepin? Comment on its role in transcription.	2
3	35	Give the role of Sigma 70 in transcription.	2
3	36	What is RNAP II holoenzyme?	2
3	37	What is a transcription bubble?	2
3	38	Differentiate between open and closed binary complex.	2
3	39	What are promoter sequences? Give an example.	2
3	40	What are upstream elements? Comment on its role in transcription.	2
3	41	What are enhancers of transcription? Comment on its role in transcription.	2
3	42	What is Pribnow box?	2
3	43	Differentiate between coding and non coding DNA strand.	2
3	44	What is a ternary complex?	2
3	45	Generally termination of eukaryotic transcription is not well defined. Why?	2
3	46	What is abortive cycling?	2
3	47	What is promoter clearance?	2
3	48	How does chain elongation takes place during transcription?	2
3	49	What is Rho factor?	2
3	50	What are sn RNA and sno RNA?	2
3	51	Highlight the importance of addition of cap and poly a A tail to m-RNA.	2
3	52	What are snRNAPs?	2
3	53	Define spliceosome.	2

3	54	What is alternative splicing? Justify alternative splicing as an agent for protein evolution.	2
3	55	What is cis and trans splicing?	2
3	56	Differentiate between RNA editing and alternative splicing.	2
3	57	Defferentiate between endonucleases and exonucleases.	2
3	58	What is RNA editing?	2
3	59	Define intron splicing.	2
4	60	What is translation? Give its significance.	2
4	61	What is genetic code? Give its importance.	2
4	62	What is the biological significance of triplet codon?	2
4	63	Which are the different features Of genetic code contributing to its versatility?	2
4	64	Assignment of codons is important for uniqueness of a genome. Justify.	2
4	65	Give the significance of studies of Khorana	2
4	66	Give the significance of studies of Nirenberg	2
4	67	What is Wobble hypothesis? Give its significance	2
4	68	Give the significance of codon Usage.	2
4	69	Which are the important Variations that occurs In The codon usage	2
4	70	What are ribosomes? Which are the different types?What is its significance?	2
4	71	What are Svedberg units?	2
4	72	Give the 3D structure Of prokaryotic ribosomes.	2
4	73	Give the 3D structure Of eukaryotic ribosomes.	2
4	74	What is the significance of ribosomal protein synthesis	2
4	75	Which are the different types of prokaryotic initiation factors? Give their significance.	2
4	76	What is shine dalgarno interaction? What is its significance?	2
4	77	What is formylation of t-RNA? Give its significance.	2
4	78	Comment on the recognition of initiator codon in prokaryotic initiation of translation.	2
4	79	What is 30s initiation complex in prokaryotic initiation? How is it formed?	2
4	80	What is 70s initiation complex in prokaryotic initiation? How is it formed?	2
4	81	What is transpeptidation reaction?	2
4	82	Which are the factors involved in translation elongation in prokaryotes? Give their significance.	2

4	83	What is the significance of proof reading in prokaryotic translation process? How is it done?	2
4	84	What is the significance of antibiotics in prokaryotic translation? Explain with one example.	2
4	85	Which are the factors involved in prokaryotic translation termination? Give their significance.	2
4	86	How does diphtheria toxin work?	2
4	87	What are the factors involved in eukaryotic translation initiation? Give their significance	2
4	88	What is the significance of methylation of t-RNA in eukaryotic translation initiation? Give its significance	2
4	89	What is 48s initiation complex in eukaryotic initiation? How is it formed?	2
4	90	What is 80s initiation complex in eukaryotic initiation? How is it formed?	2
4	91	Which are the factors involved in translation elongation in eukaryotes? Give their significance.	2
4	92	Which are the factors involved in eukaryotic translation termination? Give their significance.	2
4	93	What is post termination complex of eukaryotic translation?	2
4	94	What are polysomes? Give their significance.	2
4	95	What is ribosome recycling? Give its significance.	2
4	96	What is the importance Of mRNA?	2
4	97	What are the important roles played by tRNA?	2
4	98	What is amino acyl tRNA? How is it synthesised?	2
4	99	What is mischarging of t-RNA?	2
4	100	What is the contribution of amino acyl tRNA in translation accuracy?	2
4	101	What are internal ribosome entry sites? What is its significance?	2
4	102	What is post translational modification? Give its significance.	2
5	103	What are the different types of post translational modification?	2
5	104	What is proteolysis? Give its significance.	2
5	105	What is phosphorylation? Give its significance.	2
5	106	What is glycosylation? Give its significance.	2
5	107	What is sulfation? Give its significance.	2
5	108	What is methylation? Give its significance.	2
5	109	What is hydroxylation? Give its significance.	2

5	110	What is sumoylation? Give its significance.	2
5	111	What is lipidylation? Give its significance.	2
5	112	What is acetylation? Give its significance.	2
5	113	What is prenylation? Give its significance.	2
5	114	What is ubiquitination? Give its significance.	2
5	115	What is disulphide bond formation? Give its significance.	2
5	116	What is signal cleavage? What is its significance?	2
5	117	What are the contributions of disulphide bond formation being a PTM? Which are the enzymes involved?	2
5	118	What is O-glycosylation? What is its significance?	2
5	119	What is N-glycosylation? What is its significance?	2
5	120	What is folding of nascent protein? What is its significance?	2
5	121	What are molecular chaperones? What role does it play in PTM of proteins?	2
5	122	Attachment of glycosyl anchor is one of the important PTM. Justify.	2
5	123	What are DNA binding protein motifs? Give examples.	2
5	124	What are zinc finger? Give their significance.	2
5	125	What are leucine zippers? Give their significance.	2
5	126	What are H-T-H motifs? Give their significance.	2
1	1	Add limelight on historical prospective of molecular biology.	5
1	2	Give the characteristics features of different forms of DNA.	5
1	3	Describe isolation and purification of DNA from plant source.	5
1	4	Explain the steps in isolation and purification of DNA from animal source.	5
1	5	How do you isolate and purify mRNA from animal source? Explain.	5
1	6	Describe Griffith's experiment.	5
1	7	Discuss the evidences that let to conclude DNA is the genetic material.	5
1	8	Explain Avery, MacLeod, & McCarty's experiment. What conclusion did they draw from the outcome of the experiment?	5
1	9	Discuss the outcome of the experiments that lead to conclude RNA as the genetic material.	5

1	10	Explain Frankel and Conrat experiment.	5
1	11	Give the classification of viruses based on the genetic material.	5
2	12	Write a short note on nearest neighbour base frequency analysis.	5
2	13	Explain DNA replication in <i>E. coli</i> .	5
2	14	Explain in detail Crain's experiment.	5
2	15	Write a note on types of topoisomerases and its mechanism of action.	5
2	16	Write a short note on DNA polymerase I.	5
2	17	Give an account on structure and function of DNA polymerase III.	5
2	18	Give an account on the structure and functions of <i>E. coli</i> DNA dependent RNA polymerase.	5
2	19	Describe in detail initiation of DNA replication in <i>E. coli</i>	5
2	20	Explain termination of DNA synthesis in prokaryotes.	5
2	21	Explain the mechanism underlying in preventing re-initiation of DNA replication at the origin replication.	5
2	22	Describe in detail the initiation of eukaryotic DNA replication.	5
2	23	Write a note on fidelity of DNA replication.	5
2	24	Write a note on Trombone model of replication.	5
2	25	What is semi conservative mode of DNA replication? How was it experimentally proved?	5
2	26	What is semi discontinuous DNA replication? How was it experimentally proved?	5
2	27	Explain in detail replication of M13 bacteriophage.	5
2	28	Explain in detail replication of Lambda phage.	5
2	29	How does mitochondrial DNA replicate?	5
2	30	Give an account on rolling circle model of DNA replication.	5
2	31	Write the mechanism of action of ligase.	5
3	32	Comment on the role of CTD of RNAP II.	5
3	33	Outline the events of initiation of prokaryotic transcription.	5
3	34	Describe initiation of eukaryotic transcription.	5
3	35	Describe prokaryotic transcriptional termination.	5
3	36	Discuss rRNA biosynthesis.	5
3	37	Describe biosynthesis of t-RNA.	5
3	38	Write a short note on RNA replication of bacteriophage QB.	5

3	39	Describe prokaryotic r-RNA processing.	5
3	40	Discuss in detail t-RNA processing.	5
3	41	Discuss cap addition and poly a tail addition.	5
3	42	Detail the steps of intron splicing.	5
3	43	Describe splicing of group 3 introns and eukaryotic m-RNA primary transcript.	5
3	44	Describe processing of eukaryotic r-RNA.	5
3	45	Describe mechanism of RNA editing with examples.	5
4	46	Briefly explain the features of genetic code with example.	5
4	47	Discuss the work done by Khorana and Nirenberg.	5
4	48	Give a detailed account on evolution of genetic code.	5
4	49	Comment on the variations in usage of codons.	5
4	50	Give a detailed account on prokaryotic and eukaryotic ribosomes.	5
4	51	Briefly explain the prokaryotic translation process.	5
4	52	Briefly explain the events of prokaryotic translation initiation and the factors involved in it.	5
4	53	Briefly explain the events of prokaryotic translation elongation and the factors involved in it.	5
4	54	Briefly explain the events of prokaryotic translation termination and the factors involved in it.	5
4	55	Briefly explain the eukaryotic translation process.	5
4	56	Briefly explain the events of eukaryotic translation initiation and the factors involved in it	5
4	57	Briefly explain the events of eukaryotic translation elongation and the factors involved in it.	5
4	58	Briefly explain the events of eukaryotic translation termination and the factors involved in it.	5
4	59	Comment on the synthesis of amino acyl tRNA and its accuracy with experimental proof.	5
5	60	Explain the different types of PTM's and their significance.	5
5	61	Discuss the events of signal cleavage. Give its significance.	5
5	62	How is disulphide bridges formed on nascent protein moieties? Give its significance.	5
5	63	Write the events of O-glycosylation on nascent proteins. Give its significance	5
5	64	Write the events of N-glycosylation on nascent proteins. Give its significance.	5

5	65	Write a detailed account on folding of nascent proteins. Give its significance.	5
5	66	What are molecular chaperones? What are the different types? Comment on its structure and significance.	5
5	67	Give the mechanism of protein folding by Chaperones. Give its significance	5
5	68	What is glycosyl anchorage? Give its significance.	5
5	69	Comment on zinc fingers and their significance.	5
5	70	Comment on leucine zippers and their significance.	5
5	71	Comment on H-T-H motif and its significance.	5

Question Paper Pattern- Model Question Paper

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Q.P Code: 54102

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St. Philomena's College (Autonomous) Mysore
II Semester M.Sc. - Final Examination : May - 2019

Subject: BIOCHEMISTRY

Title: MOLECULAR BIOLOGY (HC)

Time: 3 Hours

Max Marks: 70

PART -A

10×2=20

Answer any TEN of the following:

1. a. Write the composition of RNA.
- b. What are Okazaki fragments?
- c. Define triplet binding technique.
- d. What is Chargaff's rule? What is its significance?
- e. Define Wobble hypothesis.
- f. What are signal peptides?
- g. What is promoter clearance?
- h. Write the mechanism of action of ligase.
- i. What is klenow fragment? Mention its significance.
- j. Name any two viruses containing RNA as genetic material.
- k. What is 'D' loop? Mention its significance.
- l. What is RNA editing?

PART -B

Answer any FIVE of the following:

5×10=50

2. a. How do you isolate and purify mRNA from animal source? Explain.
- b. Write an account on Hershey and Chase experiment. **5+5**
3. a. Give a note on fidelity of replication.
- b. Describe initiation of prokaryotic transcription. **5+5**
4. a. Discuss the termination of replication in prokaryotes.
- b. How is the prokaryotic transcription terminated? **5+5**
5. a. Write in detail about the processing of mRNA transcripts.
- b. Enlist the features of genetic code. **5+5**

PTO

6. a. Explain in detail about initiation in eukaryotic protein translation.
b. Describe the role of amino acyl tRNA synthetase in translation accuracy. 5+5
7. a. How are the proteins glycosylated? Explain.
b. Write on the role of Chaperons in protein folding. 5+5
8. **Write notes on any TWO of the following:**
- a. H-T-H motif
b. RNA dependent DNA synthesis
c. Trombone model of replication 5+5
