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No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY  
 M.Sc (II SEMESTER) EXAMINATIONS ( BIOCHEMISTRY )  
 21<sup>st</sup> April (Tuesday) 2015  
 Time: 2.30 to 5.30 p.m  
 Paper: PS02CBIC01- Molecular Biology

Total marks: 70

**I. Choose the most appropriate answer****(8x1 = 8)**

- i) The time required for the complete denaturation of DNA will be determined by which of the following factor?
- |                |                      |
|----------------|----------------------|
| a. Temperature | c. Length of the DNA |
| b. GC content  | d. All of the above. |
- ii) Formation of Okazaki fragments takes place on
- |                   |                 |
|-------------------|-----------------|
| a. Lagging strand | c. Both strands |
| b. Leading strand | d. None.        |
- iii) The  $\sigma$ -factor will bind to which of the following sequences?
- |              |               |
|--------------|---------------|
| a. Operators | c. Promoters  |
| b. Enhancers | d. Silencers. |
- iv) Pseudouridine, a modified base is found in
- |         |             |             |         |
|---------|-------------|-------------|---------|
| a. mRNA | b) 16S rRNA | c) 23S rRNA | d) tRNA |
|---------|-------------|-------------|---------|
- v) The primer of the lagging strand during DNA replication is removed by
- |  |
|--|
| a. 3'5'exonuclease activity of DNA polymeraseIII |
| b. DNA primase                                   |
| c. 3'5'exonuclease activity of DNA polymerase I  |
| d. 5'3'exonuclease activity of DNA polymerase I  |
- vi) Which of the following amino acids would be able to restore the attenuation control of trp operon?
- |                            |                   |
|----------------------------|-------------------|
| a. Tryptophan alone        | c. arginine alone |
| b. Tryptophan and arginine | d. None of these  |
- vii) Shine-Dalgarno sequence found in the prokaryotic mRNAs facilitates ribosome binding by interaction with the 3'end of
- |             |             |             |            |
|-------------|-------------|-------------|------------|
| a. 23S rRNA | b. 16S rRNA | c. 18S rRNA | d. 5S rRNA |
|-------------|-------------|-------------|------------|
- viii) Requirements for eukaryotic protein synthesis include all of the following except
- |         |        |               |              |
|---------|--------|---------------|--------------|
| a. mRNA | b. GTP | c. F-Met-tRNA | d. Ribosomes |
|---------|--------|---------------|--------------|

**II. Answer in brief (any seven)**

**(7x2 = 14)**

- a) What is  $T_m$ ?
- b) What are Inteins?
- c) Position and role of Histone H1.
- d) Differentiate: Monocistronic and Polycistronic RNA.
- e) Conserved sequences of *OriC*
- f) Differentiate: cis acting and trans acting elements
- g) Promoter clearance
- h) Role of aminoacyl tRNA synthetase in protein synthesis
- i) Homeotic genes of *Drosophila*

**II. ANSWER THE FOLLOWING**

**(4X12 = 48)**

1. a) Write a note on control of DNA replication in prokaryotes.  
b) Describe mismatch repair of DNA in prokaryotes..

**OR**

- b) What are histones? Explain packaging of chromosomes in eukaryotes.
2. a) Explain the role of telomerase in solving the end-replication problem in eukaryotes.  
b) Write a note on initiation of transcription in prokaryotes.

**OR**

- b) Explain the interaction between Sigma factor and DNA in detail.
3. a) Explain intron splicing in eukaryotic mRNAs in detail  
b) Describe the mechanism by which regulatory proteins recognize and bind specific sequences of DNA?

**OR**

- b) Outline the structure of tRNA with a note on the role of modified bases in tRNA function.
4. a) Explain the formation of preinitiation complex during translation in eukaryotes  
b) What is attenuation? Explain *trp* operon in detail.

**OR**

- b) What are maternal genes? Explain their role in establishment of polarity in *Drosophila*.

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