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SEAT No. \_\_\_\_\_

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SARDAR PATEL UNIVERSITY  
M.Sc. (II SEMESTER) EXAMINATIONS  
23<sup>rd</sup> October, 2018 (Tuesday)  
2.00 P.M to 5.00 P.M  
Paper: PS02CBIC21 – Molecular Biology

TOTAL MARKS: 70

1. Choose the most appropriate answer:

(10)

- a) The region of prokaryotic chromosome where initiation of replication occurs is  
a) Ori c b) promoters c) 13-mer motifs d) none of the above
- b) The protein that prevents single stranded template from forming hydrogen bonds is  
a) SSB proteins b) Dna A protein c) Topoisomerase d) helicase
- c) Generally acetylated histones are conducive to  
a) decreased chromatin condensation c) increased chromatin packaging  
b) inhibit gene expression d) none of the above
- d) How many replication forks form after the dsDNA is opened at the origin,  
a) one b) two c) three d) depends on DNA sequence
- e) The protein subunit that is responsible for promoter recognition in prokaryotes is  
a) Sigma factor b)  $\beta$  subunit c)  $\alpha$  subunit d)  $\delta$  subunit
- f) The  $-10$  promoters of bacteria control  
a) Formation of closed complex c) formation of open complex  
b) Conversion of closed to open complex d) none of these
- g) In *E.coli*, when Glucose is added to the medium, In *lac* operon is  
a) induced c) suppressed  
b) first suppressed and then induced d) none of these
- h) During mismatch repair, the DNA strand to be repaired is identified by the  
a) DNA sequence c) presence of methyl group  
b) Absence of methyl group d) presence of acetyl group

(1)

(P.T.O.)

2. Answer any seven in brief:

(14)

- a) Role of DNA helicase in DNA replication.
- b) Structure and function of Ori c
- c) Role of ARS1 in initiation of replication in eukaryotes.
- d) Rho dependant termination of transcription
- e) Functions of EF-Tu – EF-Ts in elongation of polypeptide
- f) Chemical modifications of rRNA.
- g) Secondary and tertiary structure of tRNA.
- h) Degeneracy in genetic code.
- i) Significance of formylation of Methionine in initiation of protein synthesis.

Q.3 (a) Describe the structure and composition of nucleosomes. (6)

(b) Discuss the structure and general properties of B DNA. (6)

OR

(b) Explain alteration of the chromatin function due to enzymatic modification of histone tails. (6)

Q.4 (a) Explain initiation of replication of DNA in eukaryotes. (6)

(b) What is the role of following proteins in eukaryotic DNA replication? (6)

- i) ORC
- ii) MCM complex
- iii) Cdc 6
- iv) Topoisomerase I and II

OR

(b) Outline initiation of transcription by RNA polymerase II (6)

Q.5 (a) What are the major types of transcription factors? Describe any one in detail (6)

(b) Write short notes on: (6)

- (i) Polyadenylation
- (ii) mRNA editing

OR

(b) Explain elongation of polypeptide in bacteria with a note on the role of EF-G (6)

Q.6 (a) Explain “lac” operon in detail. (6)

(b) Write notes on: (6)

- (i) Catabolite repression
- ii) Control of galactose metabolism in yeast

OR

(b) Outline the role of maternal genes in Drosophila development. (6)

—X—

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