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

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SARDAR PATEL UNIVERSITY  
M.Sc. (II SEMESTER) EXAMINATIONS  
18<sup>th</sup> March, 2019 (Monday)  
2.00 P.M to 5.00 P.M  
Paper: PS02CBIC21 – Molecular Biology

TOTAL MARKS: 70

I. Choose the most appropriate answer:

(8 marks)

- The phenomenon in which the absorbance by a DNA sample at 260nm increases with increasing denaturation is known as  
(a) Molar absorptivity (b) hypochromicity (c) Hyperchromicity (d) Fluorescence
- Nucleotide sequences present towards the right hand side of transcription start site, denoted as + (plus) are known as  
(a) Cis acting elements (c) transacting elements  
(b) upstream elements (d) downstream elements
- Inosine is formed by the chemical modification of  
(a) Guanine (b) Adenine (c) Uracil (d) none of these
- The rate of DNA replication is  
(a) Faster in prokaryotes than in eukaryotes  
(b) Faster in eukaryotes than in prokaryotes  
(c) Similar in all organisms  
(d) Dependent on movement of DNA along the enzyme
- Signal molecule that helps *E. coli* to sense the presence or absence of Glucose in medium is  
(a) Tryptophan (b) Lactose (c) ATP (d) cAMP
- Which of the following initiation factors has RNA helicase activity?  
(a) IF1 (b) eIF1 (c) eIF4G and eIF4E (d) none of the above
- During DNA replication, the two catalytic units of DNA polymerase III  
(a) Move simultaneously in a single direction  
(b) Move in opposite direction  
(c) For some time move together then separate  
(d) DNA polymerase III has only one catalytic centre
- Which domain of DNA polymerase contains catalytic site?  
(a) Finger domain – O helix (c) thumb domain  
(b) Palm domain (d) all of the above

II. Answer any seven in brief:

(14 marks)

- Describe essential features of B-DNA structure.

①

(P.T.O.)

2. Define hyperchromicity and hypochromicity of DNA.
3. How many reading frames are possible for translation of the following string of DNA molecule?

5'-AAATGAACG-3'

3'-TTTACTTGC-5'

4. What is promoter clearance? How is it achieved?
5. What is the role of 16S rRNA and 23S rRNA in 70 S ribosomes?
6. As eukaryotes have linear DNA, what is the role of topoisomerase I and II in eukaryotes?
7. Which enzyme synthesizes primers for lagging strand during replication in prokaryotic cells?
8. What is the role of TATA box Binding Protein (TBP) in initiation of transcription in Eukaryotes?
9. Differentiate between positive and negative regulation of gene expression

### III. Answer the following questions in detail:

3. (a) Explain Watson-Crick base pairs and the various bonds that are present in detail. (6)  
(b) Describe various factors that contribute to DNA stability. (6)  

OR

(b) Describe DNA binding motifs of General Transcription Factors (GTFs) in detail. (6)
4. (a) Explain opening of the two strands of double helix of DNA and initiation of replication in prokaryotic cells. (6)  
  
(b) Explain the mechanism and specificity of DNA polymerase. (6)  

OR

(b) Explain the working of telomerase. How is it able to polymerize the DNA without exogenous template? (6)
5. (a) Explain peptide bond formation and elongation of polypeptide chain in prokaryotes.  
(b) Give an account of the general properties of genetic code. (6)  

OR

(b) Explain global regulation of initiation of eukaryotic translation by eIF4E binding proteins. (6)
6. (a) Write notes on (6)
  - (i) Attenuation control of tryptophan biosynthesis in Prokaryotes
  - (ii) Catabolite repression in *E.coli*(b) Explain how chromatin remodeling plays a role in control of gene expression? (6)  

OR

(b) Write on the transcriptional level control of gene expression in eukaryotes. (6)

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