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FOURTH SEMESTER B.Tech. (BT)

MID SEMESTER EXAMINATION *March-2019*

BT 208 Structural Biology

Time: 1:30 Hours *Max. Marks: 20*

Note: Answer all the questions.
Assume suitable missing data, if any.

Q.1 Answer the following [8]

(a) With respect to telomeres, describe the formation, structure and functions of telomeric T-loop, D-loop and Shelterin complex

(b) With the help of diagrams, compare and contrast any four of the following

(i) Palindromic sequences with rotational symmetry and bilateral symmetry
(ii) Nucleosides and Nucleotides
(iii) N-1 glycosides and N-9 glycosides
(iv) C 2' endo and C 2' exo sugar pucker
(v) *syn* and anti glycosidic bonds
(vi) Parallel and antiparallel G-quadruplexes

Q.2 Answer the following [6]

(a) Fibers of DNA assume the so-called B-DNA conformation, as indicated by their X-ray diffraction patterns, when the counterion is an alkali metal such as Na^+ and the relative humidity is >92%. Explain the important features of B-DNA. Give points of differences from the canonical Watson-Crick structure

(b) Give a descriptive account of any two of the following

(i) Grooves in double helical DNA
(ii) Angular characteristics of base pair in DNA
(iii) Base stacking interactions and phosphodiester bonds in DNA
(iv) Tautomeric forms of bases

P.T.O.

Q.3 Answer the following [6]

(a) Give details of the following along with structures. Clearly indicate the positions of atoms involved
   (i) Watson-Crick base pairing
   (ii) Hoogstein base pairing

(b) Write in detail about <u>any two</u> of the following
   (i) Chargaff's rule
   (ii) Structures of four bases and sugar in DNA
   (iii) Functions and applications of G-quadruplex

END