4. (a) Elaborate the three possible modes of DNA replication and discuss as how Meselson and Stahl deduced the most accurate and accepted model. (7)

   (b) Elaborate the process of transcription initiation in prokaryotic and eukaryotic systems. (8)

5. (a) "Nearly all three major forms of RNA molecules are involved in some aspect during translation". Elaborate the statement and discuss in details the components of translational machinery. (7)

   (b) Define the term "spliceosome". Elaborate various molecular complexes associated in the assembly of spliceosome and the mechanism of splicing via spliceosome complex. (8)

6. (a) Define RNA interference. Give the steps involved in post transcriptional gene silencing by siRNA. (7)

   (b) Elaborate the various types of promoter elements in prokaryotic and eukaryotic genes. Describe at least two key features that distinguish a eukaryotic enhancer element form a promoter. (8)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5705 **K**

Unique Paper Code : 2162013501

Name of the Paper : Molecular Biology of the Cell

Name of the Course : **B.Sc. (Hons.) Botany**

Semester : V

Duration : 2 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. Attempt **four** questions in all.
4. All parts of questions must be answered together.

1. (a) Define the following **(any five)** : (1×5=5)

   (i) Transcription unit

   (ii) Consensus sequence

   (iii) Enhancer

   (iv) Snurps

(v) Repressor

(vi) Promoter clearance

(b) Fill in the blanks. (1×5=5)

(i) The process of reformation of double helices from the denatured complementary single strands of DNA is called _____.

(ii) Positive charge in histone molecules are imparted due to the presence of high percentage of _____ and _____ residues.

(iii) The Clover leaf model of tRNA structure was proposed by _____.

(iv) The _____ is responsible for recognition of promoter during prokaryotic transcription.

(v) Genes specifying proteins or enzymes that are not the part of the regulatory elements in an operon are called _____.

(c) Expand the following **(any five)** : (1×5=5)

(i) PTGS

(ii) hnRNA

(iii) TAF

(iv) UTR

(v) RISC

(vi) ORF

2. Write a short note on any three of the following. Draw proper diagrams wherever necessary. (5×3=15)

(i) Wobble Hypothesis.

(ii) Prokaryotic & Eukaryotic RNA Polymerases.

(iii) Fraenkel-Conrat reconstitution experiment.

(iv) John Cairn's experiment describing the Theta mode of replication.

(v) Transcription termination in eukaryotes

3. Differentiate between the following **(any three)** : (5×3=15)

(i) A DNA, B DNA and Z DNA.

(ii) Splicing in group I and group II introns.

(iii) Inducible and repressible system.

(iv) RNA Pol-I, RNA Pol-II and RNA Pol-III