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SARDAR PATEL UNIVERSITY  
M.Sc (II Semester) Examinations  
Friday, 30<sup>th</sup> November, 2012  
2.30 pm to 5.30 pm  
PS02CBIC01- Molecular Biology

Total marks: 70

**1. Choose the correct answer.**

(8 x 1 = 8)

- i) Which of the following is true about a circular double stranded DNA genome that is determined by chemical means to be 21% adenosine?
- A) The genome is 10.5% guanosine      B) The genome is 21% guanosine  
C) The genome is 29% guanosine      D) The genome is 58% guanosine
- ii) Which of the following steps of translation does not consume high energy phosphate bond?
- a. Translocation      c. Peptidyl transferase reaction  
b. Amino acid activation      d. Aminoacyl tRNA binding to A site
- iii) Deletion of a single base from a coding sequence of m-RNA may result in a polypeptide product with any of the following except:
- A) A amino acids sequence that differs from the sequence of the logical polypeptide  
B) A polypeptide with more amino acids  
C) A polypeptide with less amino acids  
D) A single amino acid replaced by another amino acid
- iv) RNA is very much susceptible to hydrolysis in alkali because
- A) It contain Uracil residue in its structure  
B) Its 2' OH group participates in cleavage of phosphodiester backbone  
C) Cleavage occurs in the glycosylic bonds of purine base  
D) Cleavage occurs in the glycosylic bonds of pyrimidine base
- v) Which of the following equation is correct for double stranded DNA
- A)  $A+T = G+C$       B)  $G/A = T/C$       C)  $A+C = G+T$       D)  $A/G = C/T$

vi) The enzyme responsible for movement of genetic element around the genome is

- A) DNA Helicase    B) Primase    C) Transposases    D) Reverse transcriptase

vii) Telomerase is an enzyme whose macromolecular composition is

- A) Lipoprotein                      B) Ribonucleo protein only  
C) Ribonucleic acid only          D) Protein only

viii) Which of the following statement about post transcriptional changes in RNA is true?

- A) Chemical modifications are very rare in eukaryotic rRNAs  
B) Splicing of introns occur in prokaryotic mRNAs  
C) Prokaryotic tRNAs do not undergo any chemical modifications  
D) 5' cap in mRNA is found in only eukaryotes

2. Write short notes on: (Attempt any seven):

(7 × 2 = 14)

- a) Structure of ARS1 in yeast
- b) DNA polymerase  $\alpha$
- c) Conserved and consensus sequences
- d) Functions of -10 and -35 promoters
- e) Wobble theory
- f) Role of IF-3 in translation in bacteria
- g) Aminoacyl tRNA synthetases
- h) Thymine dimers

3. (a) What is  $T_m$  value? How is it determined? What are its applications? (6)

(b) Give a comparative account of different forms of DNA (6)

**OR**

(b) Give a comparative account of mechanism of action of DNA polymerase and DNA ligase (6)

4. a) Explain the steps involved in initiation of transcription in bacteria in detail (6)

b) Write a note on Zinc finger and Helix-turn-helix proteins (6)

**OR**

b) Write a note on promoter clearance during transcriptional initiation in eukaryotes (6)

5. a) Give an account of termination of transcription by RNA polymerase II. Briefly write on the role of Poly (A) polymerase Binding Protein (6)

b) Explain the role of snRNAs in intron splicing in detail (6)

**OR**

b) Write a note on chemical modifications of rRNA and tRNA with suitable examples (6)

6. a) Describe the secondary and tertiary structure and functions of tRNA (6)

b) Explain the role of elongation factors in eukaryotic protein synthesis. (6)

**OR**

b) What is Operon? Explain gene regulation in bacteria with a suitable example (6)

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