(28) Seat No: ——— No. of Printed Pages: 02

Sardar Patel University
M. Sc. Genetics, First Semester Examination
Wednesday, 19th October, 2016
10:00 a.m. – 01:00 p.m.
***PS01CGEN01*: Cell and Molecular Biology**

Total Marks: 70

Q1. Multiple Choice Questions (Attempt all questions) **[8X1=8]**

(i) Which researcher first proposed the "breakage and reunion" model for solving the topological problem of DNA replication?
a) Delbruck b) Kornberg
c) Meselson and Stahl d) Watson and Crick

(ii) During which stage of cell cycle does DNA replication occur?
a) M b) G1
c) S d) G2

(iii) Approximately how many base pairs form the attachment between the DNA template and RNA transcript during transcription in prokaryotes?
a) 8 b) 12-14
c) 30 d) 100

(iv) The chemical modification of eukaryotic rRNA molecules takes place in the:
a) Cytoplasm b) ER
c) Nuclear envelope d) Nucleolus

(v) Codon-anticodon interactions occur by
a) Covalent bonds b) Electrostatic interactions
c)Hydrogen bonds d) Hydrophobic interaction

(vi) Which of the following is not an example of post-translational chemical modification of proteins?
a) Glycosylation b) Methylation
c) Phosphorylation d) Proteolysis

(vii) Which proteins prevent degradation or reassociation of single-stranded DNA at the replication fork?
a) Helicases b) Primases
c) SSB proteins d) Topoisomerases

(viii) "Naked" DNA
a) is free of nucleic acids b) is free of the cell.
c) contains just sugar-phosphate backbone d) is free of protein

Q2. Answer any seven questions from following: **[7X2=14]**

(i) Define Propeller twist.
(ii) Give full form of DEPC.
(iii) What are Okazaki fragments?
(iv) Explain the role of Primase in replication.
(v) What is the function of degradosome?
(vi) Name the scientists who gave concept of Operon.

(P.T.O.)

(vii) What are inteins?
(viii) Give two examples of ribozymes.
(ix) Give function of Topoisomerase II

Q3(A) Differentiate between the structural organization of prokaryotic and eukaryotic cells. [6]

Q3(B) Mention the physical properties of ds DNA. Explain any two in detail. [6]

OR

Q3(B) Give helix parameters of B-form of DNA. [6]

Q4(A) Describe briefly the three enzymes that are involved in synthesizing the leading strand copy in eukaryotes. [6]

Q4(B) Describe the mechanism for the rolling circle replication in *E. coli*. [6]

OR

Q4(B) Give a comparative account of Dispersive, Semi-conservative and Conservative mode of replication of DNA. [6]

Q5(A) Explain the cloverleaf structure of a tRNA. [6]

Q5(B) With the help of suitable diagram, explain the assembly of transcription initiation complex in prokaryotes. [6]

OR

Q5(B) List the molecules present in the pre-initiation complex that assemble during the first step of translation initiation in eukaryotes. [6]

Q6(A) Explain the structural organization of *Lac* operon with a neat labeled diagram. Mention function of each gene involved in the operon. [6]

Q6(B) Explain the structural organization of *Trp* operon with a neat labeled diagram. Mention function of each gene involved in the operon. [6]

OR

Q6(B) Explain the *Ara* operon with emphasis on its positive regulation mechanism. [6]

******** BEST OF LUCK ********

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