

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

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[46/56/A-29]

SARDAR PATEL UNIVERSITY

M. Sc. Microbiology/Biotechnology I<sup>st</sup> Semester (NC) Examination

PS01CMIC01/PS01CBIT01: Molecular Biology

Tuesday, 11/04/2017

Time: 10:00 am to 1:00 pm

Max Marks: 70

Note: Figures on the right indicate marks

Q.1 Choose the most appropriate answer (08)

- i Formamide reduces the T<sub>m</sub> value of DNA by
  - a) destabilizing ionic interactions
  - b) altering solubility of nitrogen bases
  - c) interfering with hydrogen bonding between complementary bases
  - d) disrupting base stacking interactions.
- ii The replication of entire *E.coli* chromosome requires approximately \_\_\_\_ minutes.
  - a) 18                      b) 20                      c) 38                      d) 28
- iii Which of the following enzymes do not alter the linking number of covalently closed circular form of DNA?
  - a) gyrase      b) endonuclease      c) ligase      d) both 'b' and 'c'
- iv Which of the following is an inhibitor of DNA replication?
  - a) streptomycin      b) chloramphenicol      c) puromycin      d) Nalidixic acid
- v The ribosome binding site typically located three to nine bases on the 5' side of the start codon is complementary to sequence located near to 3' end of \_\_\_\_
  - a) 5S rRNA      b) 18S rRNA      c) 16S rRNA      d) 23S rRNA
- vi Which of the following is not true for genetic code?
  - a) Genetic code is degenerate
  - b) Genetic code has punctuations
  - c) Genetic code is triplet
  - d) All of the above
- vii The protein binding site on DNA can be identified by the following experiment.
  - a) DNA footprinting                      b) mobility shift assay
  - c) Western blotting                      d) All of the above
- viii Which of the following is gratuitous inducer of *lac* operon?
  - a) glucose      b) lactose      c) allolactose      d) IPTG

Q.2 Attempt any seven of the following: (14)

- a) Explain the term: Superhelical density of DNA
- b) Explain the term: Replicon
- c) Write in brief on: Base stacking
- d) Explain in brief: Licensing of origins in eukaryotes.
- e) Draw a labelled diagram of a typical prokaryotic promoter.
- f) Differentiate between positive and negative regulation of gene expression.
- g) What are inteins?

- h) Enlist salient features of eukaryotic mRNA.  
i) What is role of sliding clamps in chromosomal DNA replication?

Q.3 a. Write a note on: Forces which contribute towards stability of ds DNA. (06)

b. Explain the mechanism of action of type I topoisomerases. (06)

OR

b. Write a note on: DNA renaturation (06)

Q.4 a. Describe in brief chromatin condensation in eukaryotes. (06)

b. Write a note on: Types of DNA polymerases in *E. coli* and their salient features. (06)

OR

b. Write a note on: Inhibitors of DNA replication (06)

Q.5 a. Describe initiation of transcription in *E. coli*. (06)

b. Write a note on: Deciphering of Genetic code (06)

OR

b. Write a note on: Initiation of translation in prokaryotes. (06)

Q.6 a. Describe attenuation regulation of gene expression giving suitable example. (06)

b. Write a note on: Post translational processing of polypeptides in bacteria. (06)

OR

b. Write a note on: Heat shock regulon (06)

-X-X-X-X-X-