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SARDAR PATEL UNIVERSITY

Bachelor of Science (Semester-5) Examination – 2025

Subject: Microbiology (USO5CMIC21)

Subject Title: Molecular genetics

Date: 04/10/2025(saturday)

Total: 70 Marks

Time: 10:00 a.m to 1:00 p.m

NOTE:

1. Figure to the right indicates total marks of the question.
2. All questions are compulsory.

Q-1 Choose any one correct option for the following questions.

[10]

- 1) The DNA model proposed by Watson and Crick was _____ form.
a) A c) C
b) B d) Z
- 2) This organism has linear DNA..
a) Actinomycetes c) *E. coli*
b) *Bacillus subtilis* d) *Borellia burgdoferi*
- 3) Substrate for DNA polymerase is _____.
a) Nucleoside triphosphate c) Deoxyribonucleoside triphosphate
b) Nucleoside d) Ribose
- 4) RNA polymerase is responsible for _____.
a) Replication c) Transcription
b) Translation d) Mutation
- 5) Core RNA polymerase of *E. coli* lacks _____ subunit.
a) α c) σ
b) β d) ω
- 6) This acts as peptidyl transferase in *E. coli*.
a) 5S RNA c) 16S RNA
b) 18S RNA d) 23S rRNA
- 7) The genetic code for this amino acid was deciphered first.
a) Alanine c) Phenylalanine
b) Methionine d) Valine
- 8) Mutations resulting in alteration of a codon for one amino acid to codon for another amino acid are called _____.
a) Samesense mutations c) Silent mutations
b) Nonsense mutations d) Missense mutations
- 9) The products of genes like *dinA*, *UvrA*, *LexA*, *RecA*, *UmuC* are all involved in _____ repair.
a) Mismatch c) Recombinational
b) SOS d) Nucleotide excision
- 10) Nitrous acid is an example of _____.
a) Intercalating agent c) Base analogue
b) Alkylating agent d) Deaminating agent



Q-2 Write short answer for the following questions (Any TEN)

[20]

- 1) Draw the structure of Adenine
- 2) Write salient features of Z-form of DNA.
- 3) Write contribution of Watson and Crick. .
- 4) Write the consensus sequence of strong promoters on a prokaryotic gene.
- 5) Write about RNA dependent RNA synthesis..
- 6) Mention the structural genes on lac operon and mention their role.
- 7) Name few unusual bases found in tRNA.
- 8) Write the composition of prokaryotic Ribosome.
- 9) Write about amino acid activation for translation in prokaryotes?
- 10) Who devised the following?
 - a) Fluctuation test
 - b) Ames's test
- 11) Write the names of two nitrogen base analogues.
- 12) Define:
 - a) Transversion mutations
 - b) Auxotrophic mutants

Q3) Describe various experiments that helped in proving DNA as genetic material. (10)
OR

Q 3) Give an account of events that occur during DNA replication in *E.coli*. (10)

Q 4) Write an elaborative note on Lactose operon in *E.coli*. (10)
OR

Q 4) Discuss the process of transcription in *E.coli*. (10)

Q 5) [A] Draw a neatly labelled diagram of tRNA and mention its significance. (05)
[B] Discuss post translational biochemical modifications of proteins. (05)
OR

Q 5) Discuss salient features of Genetic code in detail. (10)

Q 6) Describe the mechanisms of excision repair of damaged DNA. (10)
OR

Q 6) Describe the methods of isolation of the following: (05)
[A] Antibiotic resistant mutants. (05)
[B] Auxotrophic mutants

