

QP Code : 77086

(2 ½ Hours)

[Total Marks :75

- N.B. :** (1) All the questions are compulsory. Choice is internal.
(2) Figures to the right indicate full marks.
(3) All questions carry equal marks.
(4) Draw flowcharts / diagrams wherever necessary.

1. (A) Fill in the blanks (any three):-

(a) The proofreading activity of the newly synthesized DNA is done by the enzyme _____.

- (i) DNA helicase
- (ii) DNA polymerase I
- (iii) DNA polymerase III

(b) SSB's bind to _____.

- (i) double stranded DNA
- (ii) single stranded DNA
- (iii) m-RNA

(c) The synthesis of new DNA strand in prokaryotes is catalyzed by _____.

- (i) topoisomerase
- (ii) DNA polymerase II
- (iii) DNA polymerase III

(d) Synthesis of DNA is _____.

- (i) unidirectional
- (ii) bidirectional
- (iii) multidirectional

(e) UV radiation leads largely to the formation of _____.

- (i) thymine dimers
- (ii) guanine dimers
- (iii) adenine dimers

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(f) Enzyme not required for DNA replication is _____.

- (i) DNA helicase
- (ii) ligases
- (iii) restriction endonuclease

1. (B) Define any one:-

- (a) Okazaki fragment
- (b) Replication bubble.

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(C) Write a short note on any one:-

- (a) DNA polymerases
- (b) Models of DNA replication

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1. (D) Attempt any one:-

- (a) Discuss the mechanism of DNA replication in prokaryotes.
- (b) Elaborate on mismatch repair and SOS repair.

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2. (A) Fill in the blanks (any three):-

- (a) Pribnow box consists of the following 6 nucleotide bases _____.

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- (i) TATAAT
- (ii) TATATA
- (iii) TTAAAT

- (b) Termination of transcription is brought about by _____.

- (i) sigma factor
- (ii) RNA polymerase
- (iii) rho factor

- (c) The specific sequence of nucleotide bases of the prokaryote mRNA that bind with rRNA of 30S ribosome is called as _____.

- (i) Anti-shine Dalgarno sequence
- (ii) Hogness box sequence
- (iii) Shine- Dalgarno sequence

- (d) Wobble hypothesis is characterized by recognition of

- (i) a single codon by a single tRNA
- (ii) more than one codon by a single tRNA
- (iii) a single codon by more than one t- RNA

- (e) The total number of codon available to code for 20 amino acids

- (i) 20
- (ii) 64
- (iii) 61

- (f) The factories for protein synthesis is _____.
 (i) mitochondria (ii) nucleus (iii) ribosomes

2. (B) Answer **any one**:-

- (a) Effect of puromycin on protein synthesis.
 (b) Define:- Split gene

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2. (C) Write a short note on **any one**:-

- (a) Characteristics of Genetic code
 (b) RNA Polymerase

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2. (D) Attempt **any one**:-

- (a) Explain various post translational modifications of proteins.
 (b) Describe the process of transcription

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3. (A) Fill in the blanks (any three):-

- (a) Selection of cosmid can be done by _____.
 (i) cos site
 (ii) ori sequence
 (iii) antibiotic resistance

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- (b) PBR322 is a _____.
 (i) plasmid
 (ii) bacteriophage
 (iii) cosmid

- (c) Vector used for cloning very large (50kb) sequences of DNA is _____.
 (i) *E.coli*
 (ii) phages
 (iii) BAC

- (d) Hind III produces _____ ends.
 (i) blunt
 (ii) sticky
 (iii) both

- (e) The cloning vectors containing signals for protein synthesis are called _____.
 (i) expression vector
 (ii) shuttle vectors
 (iii) transposons

[TURN OVER]

- (f) DNA segment to be cloned is called as _____.
(i) gene segment
(ii) DNA insert
(iii) DNA fragment
3. (B) Give the role of **any one** enzyme : 2
(a) Ligases (b) Reverse transcriptase
- (C) Write a short note on **any one** :- 4
(a) Probes used for cloning (b) Restriction endonucleases
- (D) Attempt **any one**:- 6
(a) Elaborate on various applications of RDT.
(b) Write a short note on various cloning vectors.
4. (A) Fill in the blanks (**any three**):- 3
- (a) The technique employed for the amplification of a selected DNA fragment _____.
(i) PCR
(ii) recombination
(iii) transformation
- (b) cDNA contains copies of DNA sequence that are present in the _____.
(i) mRNA
(ii) tRNA
(iii) hnRNA
- (c) Taq polymerase is isolated from _____.
(i) *Thermophilus aquaticus*
(ii) *Thermus thermophilus*
(iii) *Saccharomyces cerevisiae*
- (d) Southern blotting is used for identification of _____.
(i) DNA
(ii) RNA
(iii) protein

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- (e) During gene transfer to protect genes from nuclear digestion they are incorporated in _____.
 (i) liposome
 (ii) phagosome
 (iii) phagolysosome
- (f) Microprojectile method of gene transfer in plants involves delivery of DNA with the help of _____.
 (i) micromanipulator
 (ii) bolistics
 (iii) needles

4. (B) Define **any one** :- 2
 (a) Transfection (b) Chimeric DNA
4. (C) Write a short note on **any one** :- 4
 (a) Gene library (b) Colony hybridization
- (D) Attempt **any one**:- 6
 (a) Describe the technique used for cell free molecular cloning.
 (b) Write a short note Southern blotting
5. (A) Answer the following **any one**:- 3
 (a) Explain theta mode of DNA replication
 (b) Explain excision repair.
- (B) Write a short note on **any one**:- 3
 (a) Activation of t-RNA
 (b) Post transcriptional modifications m-RNA
- (C) Write a short note on **any one**:- 3
 (a) YAC vector
 (b) Genetically engineered insulin
- (D) Explain the process of **any one**: 3
 (a) Electroporation
 (b) Antibiotic selection

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(E) State True or False (**any three**):-

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- (a) SOS repair is an error prone repair
- (b) POMATO is an transgenic plant
- (c) DNA polymerase is used in PCR.
- (e) Introns are present in prokaryotic m-RNA.
- (f) Magnesium optimizes DNA polymerase activity.
- (g) pUC-19 is a cloning vector

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