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**):- 3

(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**:- 2
  (a) Okazaki fragment (b) Replication bubble.

  (C) Write a short note on **any one**:- 4
  (a) DNA polymerases (b) Models of DNA replication

1. (D) Attempt **any one:-** 6
  (a) Discuss the mechanism of DNA replication in prokaryotes.
  (b) Elaborate on mismatch repair and SOS repair.

2. (A) Fill in the blanks (**any three**):- 3
  (a) Pribnow box consists of the following 6 nucleotide bases_____.
    (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

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(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. 2
(b) Define:- Split gene

2. (C) Write a short note on **any one**:- 4
(a) Characteristics of Genetic code
(b) RNA Polymerase

2. (D) Attempt **any one:**- 6
(a) Explain various post translational modifications of proteins.
(b) Describe the process of transcription

3. (A) Fill in the blanks (any three):-
(a) Selection of cosmid can be done by _____. 3
(i) cos site
(ii) ori sequence
(iii) antibiotic resistance

(b) PBR322 is a_____.
(i) plasmid
(ii) bacteriopage
(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

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(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) *Thermophillus aquaticus*
- (ii) *Thermus thermophillus*
- (iii) *Saccharomyces cerevisiae*

(d) Southern blotting is used for identification of _____.
- (i) DNA
- (ii) RNA
- (iii) protein

(e) During gene transfer to protect genes from nuclear digestion they are incorported in _____.
- (i) liposome
- (ii) phagasome
- (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

(E) State True or False (**any three**):- 3

(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
