Q.P. Code :20219

[Time: $2\frac{1}{2}$Hours] **[Marks: 75]**

Please check whether you have got the right question paper.

N.B:
1. **All** questions are **compulsory**.
2. Choice is **internal**.
3. Draw diagrams wherever necessary.
4. Non-programmable calculators are permitted.
5. **Figures** to the **right** indicate **full** marks.

Q.1 A) Choose the **MOST APPROPRIATE** answer **any three:** **03**

i) _____protein acts as helicase during prokaryotic replication.
a) Dna A b) Dna B c) Dna C

ii) The polymerization activity of DNA pol III resides in _____subunit.
a) alpha b) epsilon c) theta

iii) In prokaryotes, DNA methylase acts on all _____residues.
a) guanine b) adenine c) thymine

iv) _____catalyses the cleavage of unmethylated strand on the 5'-side in mismatch repair.
a) Mut H b) Mut L c) Mut S

v) Klenow fragment does not retain _____activity.
a) 5'-3' exonuclease b) 3'-5' exonuclease c) 5'-3' polymerization

vi) The catenanes are separated into two daughter DNA molecules by_____.
a) topoisomerase b) DNA glycosylase c) DNA ligase

B) Answer in brief, **any one:** **02**

i) Thymine dimer
ii) Primer

C) Write a short note on **any one**: **04**

i) Base excision repair
ii) Prokaryotic DNA polymerases

D) Answer **any one** of the following: **06**

i) Prokaryotic replication
ii) SOS mismatch repair

Q.2 A) Choose the **MOST APPROPRIATE** answer **any three:** **03**

i) RNA polymerase binds loosely to the promoter at _____region.
a) pribnow box b) - 35 box c) -10 box

ii) _____blocks the movement of RNA polymerase.
a) Actinomycin b) Rifampicin c) Puromycin

iii) _____dissociates resulting in the formation of active spliceosome.
a) U1 snRNP b) U4 snRNP c) U6 snRNP

iv) In prokaryotes, release stop codon UAA is recognized by _____.
a) RF_1 b) RF_2 c) RF_1 & RF_2

v) The 5'-capping is the addition of _____at the 5'-end of the pre-mRNA.
a) m^3G b) m^5G c) m^7G

vi) The amino acid is linked to _____residue at the 3'-end of the tRNA.
a) adenine b) guanine c) cytosine

B) Define Explain **any one**: **02**

i) Rho protein
ii) Genetic code

C) Write short notes on **any one** of the following: **04**

i) Initiation Inhibitors of transcription
ii) Activation of amino acids in translation

D) Write short notes on **any one** : **06**

i) RNA splicing
ii) Elongation stage of translation

Q.3 A Choose the **MOST APPROPRIATE** answer **any three:** **03**

i) The _____vector has multiple cloning site.
a) pUC 19 b) pBR 322 c) cosmid

ii) Gene probes are single stranded_____.
a) DNA b) RNA c) DNA & RNA

iii) A homopolymer tail can be added by_____enzyme.
a) terminal transferase b) alkaline phosphatase c) ligase

iv) Cry proteins produced by *Bacillus thuringiensis* are _____.
a) beta-endotoxins b) gamma-endotoxins c) delta-endotoxins

v) _____is a 2686 bp vector.
a) pUC 19 b) Lambda-phage c) Cosmids

vi) _____restriction endonucleases are made up of one subunit.
a) Type I b) Type II c) Type II

B) Define and explain **any one**: **02**
i) Plasmid ii) Probes

C) Write short notes on **any one:** **04**
i) Applications of RDT in medicine
ii) Shuttle vectors

D) Elaborate on **any one:** **06**
i) Restriction endonucleases
ii) BAC and YAC

Q.4 A) Choose the **MOST APPROPRIATE** answer **(any three):** **03**
i) In_____ transformation, bacteria are naturally able to take up DNA and be genetically transformed by it.
a) natural b) engineered c) recombinant

ii) In chemical based transformation of genes, _____can be used.
a) calcium b) calcium Phosphate c) PEG

iii) For selection and screening in RDT _____antibiotic is used. .
a) RAPD b) RT-PCR c) c-DNA

iv) Genomic library is a collection of .
a) DNA b) m-RNA c) c-DNA

v) A short oligod T chain is hybridized _____to each mRNA strand.
a) 3' end b) 5' end c) 5' end 3’ end

vi) In PCR _____is used to extend primers.
a) DNA polymerase I b) DNA polymerase III c) Taq polymerase

B) Define and explain **any one** of the following: **02**
i) cDNA
ii) Gene library

C) Define and explain the following **any one**: **04**
i) Colony hybridization
ii) Southern blotting

D) Write short notes on **any one:** **06**
i) DNA amplification by PCR and its applications
ii) Gene transfer techniques:
i) Lipofection ii Electroporation

Q.5 A) Discuss in detail **any one:** **03**
i) Rolling circle replication
ii) Direct repair

B) Write a note on **any one** of the following **03**
i) Termination of transcription
ii) Role of Puromycin

C) Comment on **any one:** **03**
i) Terminal transferase
ii) pBR 322

D) Write a note on **any one** of the following - **03**
i) Particle gun method
ii) Applications of RDT in agriculture

E) State true or False: **(any three)** **03**
i) The Ori C contains about 245 base pairs.
ii) The topoisomerase type I bring about single strand nick in DNA.
iii) The lariat structure formed during RNA splicing involves the formation of 2' - 5' phosphodiester bond.
iv) cDNA libraries involve the isolation of chromosome of interest.
v) DNA polymerase requires activation of phosphate by adenylation.
vi) cDNA molecules and linkers with blunt ends can be ligated at high concentration of T_4 DNA ligase.

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