



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.Sc. DEGREE EXAMINATION – BIOTECHNOLOGY**

**SECOND SEMESTER – APRIL 2018**

**16/17PBT2MC01- MOLECULAR BIOLOGY AND GENETIC ENGINEERING**

Date: 17-04-2018  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

**PART – A**

**Answer ALL the Questions**

**I. Choose the correct answer**

**(5 x 1 = 5 Marks)**

- Which of the following is false about gene transfer
  - Transformation requires competent cells .
  - Gene order can be found using interrupted mating studies.
  - In Hfr mating, the origin is the fixed locus from which the gene transfer occur.
  - The F plasmid exists as a plasmid and cannot be integrated with the chromosome.
- The position on a purine attacked by alkylating agents is \_\_\_\_\_.
  - N7
  - N9
  - O6
  - O7
- Choose the RNA polymerase that transcribes tRNA in eukaryotes.
  - RNAP I
  - RNAP II
  - RNAP III
  - RNAP IV
- The following techniques are used to identify transcription start site EXCEPT
  - S1 nuclease
  - Run off transcription
  - qPCR
  - CAGE
- Which of the following methods gradually reduces annealing temperature in a PCR reaction?
  - Nested
  - Colony
  - Hotstart
  - Touch down

**II. State whether the following are True or False.**

**(5x1=5 Marks)**

- The closer two loci on the F plasmid, greater is the probability to be transferred during conjugation.
- Double stranded breaks are less damaging than breaks in single stranded breaks.
- Kozak sequence plays an important role in translation initiation.
- Replacement phage vectors have minimum packaging capacity than insertion vectors.
- At the end of fourth cycle of PCR, 32 copies amplified product will be present.

**III. Complete the following**

**(5 x 1= 5 Marks)**

- \_\_\_\_\_ is a mutant organism that requires an additional nutrient to grow, while wild type do not require.
- The number of bases per turn in an A DNA is\_\_\_\_\_.
- \_\_\_\_\_ is the site for mRNA splicing.
- \_\_\_\_\_ is the enzyme used for conversion of mRNA to DNA.
- \_\_\_\_\_ acts as a cofactor for Taq polymerase.

**IV. Answer the following within 50 words**

**(5 x 1 = 5 Marks)**

16. Define epigenetics.
17. Mention the mismatch associated with 8-Oxoguanine.
18. What is a core promoter?
19. Mention the function of Klenow enzyme.
20. Differentiate between dNTP and ddNTP.

**PART B**

**Answer the following each within 500 words.**

**(5 x 8 = 40 Marks)**

**Draw diagrams wherever necessary.**

21. (a) Demonstrate semiconservative mode of replication through findings of Meselson and Stahl's experiment.

OR

(b) Write notes on generalized transduction and specialized transduction.

22. (a) Devise a method to study gene rearrangements using a *Cre/Lox* system.

OR

(b) Compare and contrast the features of A DNA and B DNA.

23. (a) Explain 5' capping and polyadenylation of eukaryotic mRNA.

OR

(b) Comment on glycosylation and phosphorylation.

24. (a) Employ a suitable vector system to produce MBP fusion proteins.

OR

(b) Classify restriction enzymes based on their activity.

25. (a) Illustrate a method to quantify mRNA using molecular beacons.

OR

(b) Mention the factors to be considered for a good primer design.

**PART – C**

**Answer any TWO of the following, each within 1500 words.**

**(2 x 20 = 40 Marks)**

**Draw diagrams wherever necessary.**

26. Describe the steps involved in bacterial replication.

27. Write an essay on mechanisms of base excision, nucleotide excision, mismatch and SOS repair.

28. Discriminate between inducible operon and repressible operons using suitable examples.

29. Elaborate on the principle behind pyrosequencing and illumina sequencing.

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