PRINCIPLES OF MOLECULAR CELL BIOLOGY
(SEMESTER - 2)

CS/M.Sc (Genetics)/SEM-2/MSGEN-203/09

1. ..... *Signature of Invigilator*

2. ..... *Signature of the Officer-in-Charge*

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/M.Sc (Genetics)/SEM-2/MSGEN-203/09

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

PRINCIPLES OF MOLECULAR CELL BIOLOGY (SEMESTER - 2)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

---

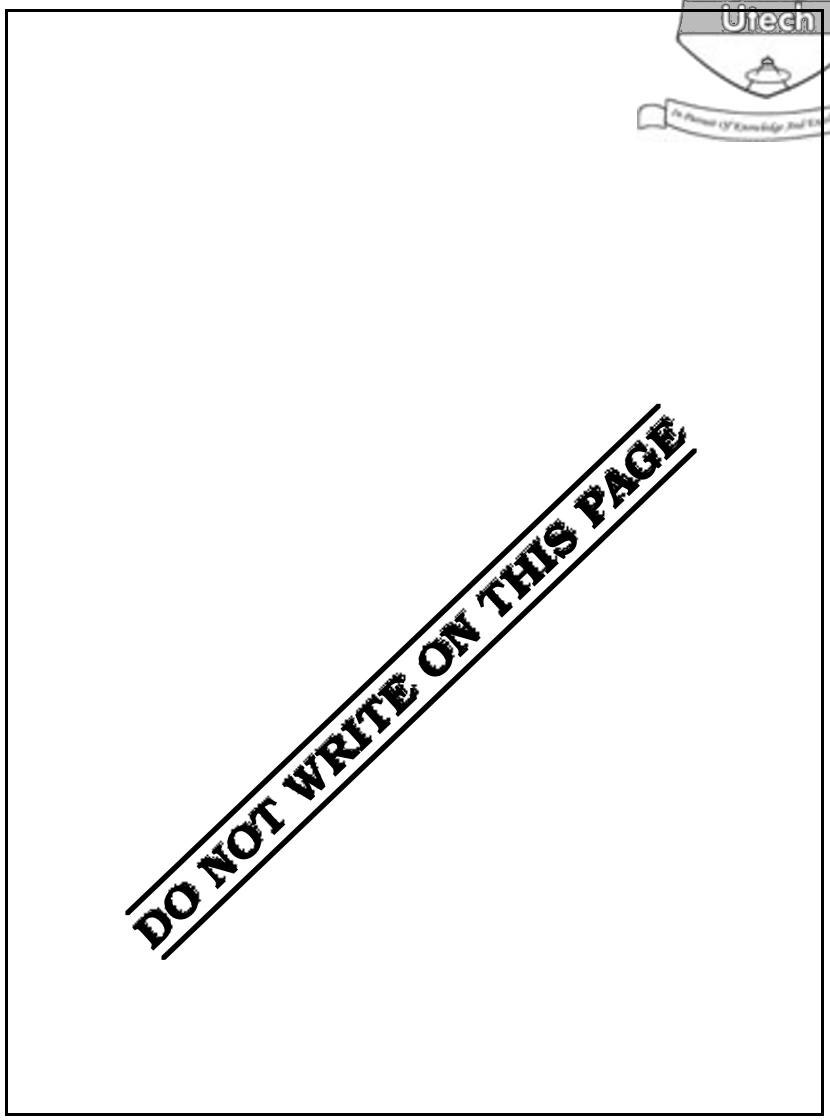
FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B				Group – C				
Question Number																		***Total Marks***	***Examiner's Signature***
Marks Obtained																			

.....

Head-Examiner/Co-Ordinator/Scrutineer


DO NOT WRITE ON THIS PAGE

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

PRINCIPLES OF MOLECULAR CELL BIOLOGY

SEMESTER - 2

Time : 3 Hours] [Full Marks : 70

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 ∞ 1 = 10

i) Cloning requires all the following, *except*

a) Restriction enzyme b) DNA ligase

c) Methylase d) Vector. ☐

ii) EcoR1 is a ..... restriction enzyme.

a) type I b) type II

c) type III d) none of these. ☐

iii) Which one of the following is used in bacterial transformation ?

a) $CaCl_2$ b) Na_2CO_3

c) $SnCl_2$ d) NaCl. ☐

iv) 'ARS' is

a) Artificially Replicating Sequence

b) Autonomously Replicating Sequence

c) Automatically Replicating Sequence

d) none of these. ☐

v) The stringency of a hybridization reaction depends on all of the following, *except*

a) NaCl concentration b) type of reporter molecule

c) nucleotide sequence of probe d) pH. ☐

vi) Principal function of reporter molecule in DNA hybridization assay is to

a) enhance the stringency of hybridization reaction

b) aid in base pairing

c) aid in the detection of probe target hybridization

d) bind the target DNA to the solid support. ☐

vii) All the following factors affect the fidelity of PCR *except*

a) $MgCl_2$ b) pH

c) annealing temperature d) Taq polymerase. ☐

viii) Which one is employed in the DNA hybrization assay ?

a) Etbr b) Enzyme

c) Chemiluminiscent moiety d) None of these. ☐

ix) Which of the following methods is not useful for enzymatic amplification of specific segment of DNA ?

a) Nucleotide sequencing b) DNA hybridization

c) PCR d) None of these. ☐

x) Gene expression can be analyzed by

a) Southern Blot b) Restriction Digestion

c) Northern Blot d) none of these. ☐

xi) In Southern Blotting experiment, the binding of transferred DNA to the Nitrocellulose Membrane is …… type.

a) Ionic b) Covalent

c) Hydrophobic d) Van der Waal. [ ]

xii) In West Blot, the protein samples are run on

a) Agarose gel b) Polyacrylamide gel

c) Formaldehyde-Agarose gel d) None of these. [ ]

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 ∞ 5 = 15

2. Explain the role of restriction enzymes in molecular cloning.

3. Describe the application of Micro-array.

4. Define Molecular Cloning Technology.

5. What do you mean by Restriction Modification System in bacteria. Explain.

6. What is RAPD ? What are its applications ? 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 ∞ 15 = 45

7. What is DNA cloning ? Why is DNA cloning important ? Describe commercial application of DNA cloning. What is reverse cloning ? 3 + 5 + 5 + 2

8. What characteristics do cloning vectors have ? What are the criteria of choosing any cloning vector ? What is the utility of having antibiotic resistant markers in vectors ? What is Blue-White screening and how can you screen the successful transformed cells carrying both the vector and insert from those carrying only vectors by this method ? Comment on YAC. 4 + 2 + 2 + 2 + 2 + 3

9. Briefly describe the steps (preferably with diagram) involved in PCR mentioning the appropriate temperature at each step. How is annealing temperature related to *Tm* of your DNA sample ? Write the advantages of PCR over cloning. Compare different PCR techniques. 4 + 2 + 3 + 6

10. Why do you need to label your probe before using in all blotting experiments ? What are the different types of labelling techniques, for the probe ? How can you introduce the following labelling in the probe ?

    i) 5′ labelling

    ii) 3′ labelling

    iii) Internal labelling.

    Give an example of non-radio-labelling of probe. Mention its advantages.

    3 + 4 + 3 + 2 + 3

11. Write short notes on any *three* the following : 3 ∞ 5

    a) Site-directed mutagenesis and *Xeroderma pigmentosa.*

    b) Protein Engineering and its medical importance.

    c) Gene Transfer Methods used in *E coli* research.

    d) RT PCR – advantages.

END