This question paper contains 4 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **5294**

Unique Paper Code : **3184001001**

Name of the Paper : **Concepts in Biotechnology**

Name of the Course : **B.Sc. (Hons.) Biomedical Science**

Semester : **II/IV**

Duration : **3 Hours** Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Question No. **1** is compulsory.

Give illustrations and examples wherever required.

Subparts of the questions should be attempted together.

1. (*a*) Define the following (any *five*) : 5×2=10

(*i*) Palindromic sequences

(*ii*) Blotting

(*iii*) Ori C

(*iv*) Adapters

(*v*) Probe

(*vi*) Tracking dye.

P.T.O.

(*b*) State True *or* False and justify (any *four*) : 4×2=8

(*i*) Ethanol precipitation is preferred over isopropanol precipitation in the process of plasmid DNA isolation.

(*ii*) In agarose gel electrophoresis, DNA fragments move towards the cathode.

(*iii*) Restriction enzymes often work as exonucleases.

(*iv*) *c*DNA libraries represent the expressed part of an organism's genome.

(*v*) Vectors always contain a promoter sequence to initiate gene expression

2. (*a*) Differentiate between the following (any *three*) : 3×3=9

(*i*) Western and Southern hybridization

(*ii*) Genomic DNA library and *c*DNA library

(*iii*) Native and SDS-PAGE

(*iv*) Colony and plaque hybridization.

(*b*) Write short notes on (any *three*) : 3×3=9

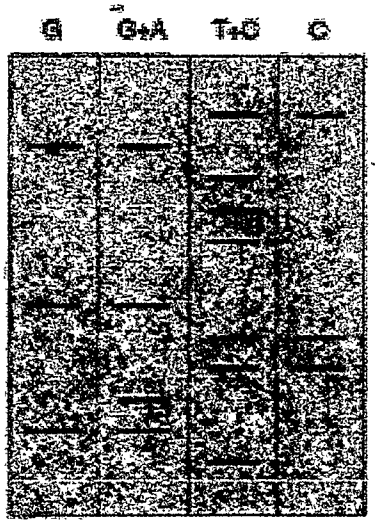
(*i*) Restriction Enzymes

(*ii*) Agarose gel electrophoresis

(*iii*) Multiplex PCR

(*iv*) Blue/white screening.

3. (*a*) The autoradiogram obtained after sequencing of a template strand is shown below. Elaborate in detail the method that has been used for sequencing. Also give the sequence of the template strand explaining how you obtained it. 9



(*b*) Explain how gene cloning techniques are being applied for the production of recombinant pharmaceuticals, with a suitable example. 9

4. (*a*) Detail the strucure and function of an expression vector. List the challenges encountered while using *E. coli* as the host for recombinant protein synthesis. 6

(*b*) Plasmid pRIT453 was cut with *Sma*I, *Hind*III, and *Eco*RI. From the data given below, determine the restriction map : 6

*Eco*RI	7.7	1.6		
*Hind*III	7.4	1.9		
*Eco*RI + *Hind*III	4.5	1.9	1.6	1.3

P.T.O.

(*c*) What does "GMOs" stand for ? Give *two* examples. Discuss the biosafety concerns related to their use. 6

5. (*a*) What is Gene therapy ? Give a detailed account of the first successful gene therapy. Discuss the ethical concerns associated with it. 9

(*b*) Explain in detail the technique of DNA profiling with the help of a diagram. 9

6. (*a*) Compare and contrast the features of agarose gel electrophoresis with that of polyacrylamide gel electrophoresis. 9

(*b*) Give a brief account of different vectors used for cloning of a DNA fragment. 9