Duration: 3 Hours **Total marks: 80**

N.B. : 1. All questions are compulsory
2. Draw neat labelled diagrams wherever necessary.

Q. 1	**Answer the following questions.**	**20**
a	Write a note on biotechnology relevance to pharma industry.	**2**
b	Enlist the advantages and disadvantages of continuous fermentation.	**2**
c	Enumerate the enzymes involved in rDNA technology.	**2**
d	Write a note on SDS-PAGE.	**2**
e	Write in brief about cDNA library.	**2**
f	Write a note on use of microbes in industry.	**2**
g	Write a note on specific defence mechanism.	**2**
h	Write in brief about organization of immune system.	**2**
i	Give storage conditions of vaccines.	**2**
j	Write a note on continuous cell culture.	**2**

Q. 2	**Answer the following questions.**	**12**
a	Explain air lift fermenters.	**4**
b	Write a note on Down stream process.	**4**
c	Write a note on gene expression system.	**4**
	OR	
	Give the applications of rDNA technology.	

Q. 3	**Answer the following questions.**	**12**
a	Explain the process of production of Interferon using rDNA technology.	**4**
b	Enlist blotting techniques and explain any one.	**4**
c	Explain any one method of DNA sequencing.	**4**
	OR	
	Write a note on transgenic plants.	

Q. 4	**Answer the following questions.**	**12**
a	Write in detail about biosensors.	**4**
b	Explain the first line of body defence.	**4**
c	Write a note on cell mediated Immunity.	**4**
	OR	
	Draw and explain antibody structure.	

Q. 5	**Answer the following questions.**	**12**
a	Write a note on ELISA.	**4**
b	Write in detail about production of monoclonal antibodies.	**4**
c	Give the method of preparation of Diptheria vaccine.	**4**
	OR	
	Outline general method of preparation of BCG vaccine.	

Q. 6	**Answer the following questions.**	**12**
a	Enlist Pharmaceutical applications of Animal cell culture.	**4**
b	Write about microbial biotransformation and give its applications.	**4**
c	Give applications of Bioinformatics in Pharmaceutical industry.	**4**
	OR	
	Define bioinformatics and write the historical importance.	

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