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 branches of biotechnology.		2
b	Enlist the advantages and disadvantages of batch fermentation.		2
c	Write in brief about organization of immune system.		2
d	Write a note on primary cell culture.		2
e	Write in brief about cDNA library.		2
f	Enlist the name of microbes with their uses in industry.		2
g	Write a note on continuous cell culture.		2
h	Enumerate the vectors involved in rDNA technology.		2
i	Give classification of vaccines.		2
j	Write a note on specific defence mechanism.		2
Q. 2	**Answer the following questions.**		**12**
a	Explain various controls in mechanically stirred fermenters.		4
b	Write a note on PCR		4
c	Enlist and explain factors affecting fermentation.		4
	OR		
	Explain steps involved in rDNA technology.		
Q. 3	**Answer the following questions.**		**12**
a	Define immobilization, enlist the methods of immobilization and explain any one in detail.		4
b	Explain southern blotting technique with its applications.		4
c	Explain Maxim Gilbert method of DNA sequencing.		4
	OR		
	Write a note on transgenic animals.		
Q. 4	**Answer the following questions.**		**12**
a	Explain use of biosensor to determine glucose concentration.		4
b	Define hypersensitivity reaction, enlist its classes and explain any one in details.		4
c	Write a note on Humeral Immunity.		4
	OR		
	Draw and explain antibody structure.		
Q. 5	**Answer the following questions.**		**12**
a	Give the method of preparation of BCG vaccine.		4
b	Explain hybridoma technology and write its applications.		4
c	Write a note on ELISA.		4
	OR		
	Outline general method of preparation of Tetanus antitoxin sera.		
Q. 6	**Answer the following questions.**		**12**
a	Write a note on tissue culture media.		4
b	Write with example “Steroidal biotransformation using microbes”.		4
c	Give applications of Bioinformatics in Pharmaceutical industry.		4
	OR		
	Define bioinformatics and write the historical importance.		