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GIET UNIVERSITY, GUNUPUR – 765022
 B. Tech (Fifth Semester – Regular) Examinations, December – 2022
BPCBT5040 – Bioreactor Design and Analysis
 (Biotechnology)

Time: 3 hrs

Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)

(1 x 10 = 10 Marks)

- Q.1. Answer ALL questions [CO#] [PO#]
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|--|-----|--------------------------------------|
| a. The bioreactor is not capable of _____ | CO1 | PO1 |
| (i) Producing aseptic conditions | | (ii) Meeting containment regulations |
| (iii) Controlling pH | | (iv) Produce electricity |
| b. Which of the following fermenters are characterized by height to diameter ratio? | CO1 | PO1 |
| (i) Tower fermenter | | (ii) Airlift fermenter |
| (iii) Hollow fibre | | (iv) Perfusion bioreactor |
| c. In which of the following fermenters the impellers are replaced by the constant flow | CO1 | PO1 |
| (i) Tower fermenter | | (ii) Airlift fermenter |
| (iii) Hollow fibre | | (iv) Perfusion bioreactor |
| d. Which of the following is used to grow anchorage-dependent cells? | CO2 | PO1 |
| (i) Hollow fibre | | (ii) Perfusion bioreactor |
| (iii) Tower fermenter | | (iv) Airlift fermenter |
| e. What is the function of carbon in stainless steel? | CO2 | PO1 |
| (i) Improves ductility | | (ii) Reduces sensitization |
| (iii) Improves resistance to corrosion | | (iv) Improves halogen resistance |
| f. What is the basic function of the fermenter? | CO2 | PO1 |
| (i) To sterilize the medium | | (ii) To recover the product |
| (iii) To provide optimum growth conditions to organisms and obtain the desired product. | | (iv) To purify the product |
| g. Which of the following is not required in surface fermentation? | CO3 | PO1 |
| (i) Aeration | | (ii) Baffles |
| (iii) Stirrer | | (iv) Agitation |
| h. Which of the following physicochemical factor does not affect Solid state fermentation? | CO3 | PO1 |
| (i) Pressure | | (ii) Temperature |
| (iii) pH | | (iv) Moisture content |
| i. The levels of primary metabolites are regulated by | CO4 | PO1 |
| (i) Feedback mechanism | | (ii) rDNA Technology |
| (iii) Incubating the microorganism in dark | | (iv) Adding the inhibitors |
| j. _____ are devices used to detect the presence or concentration of a biological analyte, such as a biomolecule, a biological structure or a microorganism. | CO4 | PO1 |
| (i) Biosensors | | (ii) Transducers |
| (iii) Optic Fiber | | (iv) Regulator |

PART – B: (Short Answer Questions)**(2 x 10 = 20 Marks)**Q.2. Answer ALL questions

	[CO#]	[PO#]
a. Define fluidization ?	CO1	PO1
b. Define airlift bioreactor and write its features?	CO1	PO1
c. Write features and applications of plug flow bioreactor?	CO1	PO1
d. Define batch reactor and its advantages?	CO2	PO1
e. Write about the role of baffles?	CO2	PO1
f. Define the RTD?	CO2	PO1
g. Define mass transfer coefficient?	CO3	PO1
h. What is scale up?	CO3	PO1
i. Define RQ?	CO4	PO1
j. Write about the physical variables used in a bioreactor?	CO4	PO1

PART – C: (Long Answer Questions)**(10 x 4 = 40 Marks)**Answer ALL questions

	Marks	[CO#]	[PO#]
3. a. Write the definition, features, mechanism of continuous stirred tank reactor?	5	CO1	PO1
b. Write the advantages and disadvantages of continuous stirred tank reactor?	5	CO1	PO1
(OR)			PO1
c. Write the definition, features, mechanism of airlift bioreactor?	5	CO1	PO1
d. Write the advantages and disadvantages of airlift bioreactor?	5	CO1	PO1
4. a. Write the principal, design and applications of a bioreactor?	10	CO2	PO1
(OR)			PO1
b. Write in brief about the tools or parts used in bioreactor and their uses?	10	CO2	PO1
5. a. Write about packed bed bioreactor features and advantages?	5	CO3	PO1
b. Write about the features and mechanism of a reactor where membrane containing cells used?	5	CO3	PO1
(OR)			PO1
c. Write in detail about the gas-liquid bioreactors?	5	CO3	PO1
d. Write about the stability of a reactor?	5	CO3	PO1
6. a. Write about different types of chemical variables used in a reactor?	10	CO4	PO1
(OR)			PO1
b. Write about the biological variables used in a bio-process control?	10	CO4	PO1

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