NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech.

SEM: II - THEORY EXAMINATION (2021 - 2022)

Subject: Enzyme Technology & Industrial Application

Time: 3 Hours   Max. Marks: 70

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.

2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.

3. Section B - Question No-3 is based on external choice carrying 4 marks each.

4. Section C - Questions No. 4-8 are within unit choice questions carrying 7 marks each.

5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A   15

1. Attempt all parts:-

1-a.   What is the nature of an enzyme? (CO1)   1

           (a) Vitamin

           (b) Lipid

           (c) Carbohydrate

           (d) Protein

1   Which of the following has a spiral metabolic pathway? (CO2)   1

           (a) Glycolysis

           (b) Citric acid cycle

           (c) Glyoxylate cycle

           (d) Fatty acid biosynthesis

1-c.   The reverse of Hydraulic Retention Time [HRT] is the _____ (CO3)   1

           (a) Sedimentation rate

           (b) Dilution rate

           (c) Filtration rate

           (d) Chemical rate

1-d.   The pore size for the removal of viruses is _____ (CO4)   1

        (a) 20 nm

        (b) 30 nm

        (c) 25 nm

        (d) 35 nm

1-e.   For household laundering _____ is used in detergent industry. (CO5)   1

        (a) alcalase

        (b) cellulase

        (c) amylase

        (d) maxatase

2. Attempt all parts:-

2.a.   Whar do you understand by Immobilization of enzymes? (CO1)   2

2.b.   How can nitrogen source affect microbial growth? (CO2)   2

2.c.   Why media optimization is much needed step in bioprocess engineering? (CO3)   2

2.d.   How you calculate Rf value in paper chromatography? (CO4)   2

2.e.   How enzymes can be used for analytical agents? (CO5)   2

<div align="center">SECTION B   20</div>

3. Answer any <u>five</u> of the following:-

3-a.   What is the role of enzymes in waste degradation? (CO1)   4

3-b.   Explain mass tranfer phenomena through immobilized enzyme? (CO1)   4

3-c.   Derive the equation for the microbial growth in batch reactor? (CO2)   4

3-d.   What is Stoichiometry for a chemical reaction? (CO2)   4

3.e.   Draw well labelled diagram of fermenter? (CO3)   4

3.f.   Explain the filtration theory? (CO4)   4

3.g.   Name the enzyme used in recombinant DNA technology? (CO5)   4

<div align="center">SECTION C   35</div>

4. Answer any <u>one</u> of the following:-

4-a.   Draw lineweaver burk plot for competitive inhibition? (CO1)   7

4-b.   What changes occur in Vmax and Km during uncompetitive inhibition? (CO1)   7

5. Answer any <u>one</u> of the following:-

5-a.   What are the factors on which growth of microbe is dependent? (CO2)   7

5-b.   Why is mass balance and energy balance required for a process? (CO2)   7

6. Answer any <u>one</u> of the following:-

6-a.   Describe the different type of bioprocess engineering with examples? (CO3)   7

6-b.   Write down the differences among batch, fed batch and CSTR bioreactor? (CO3)   7

7. Answer any <u>one</u> of the following:-

7-a.   Explain the process of cell disruption along with its type? (CO4)   7

7-b.   Explain the functioning of affinity chromatography along with diagram? (CO4)   7

8. Answer any <u>one</u> of the following:-

8-a.   Oil spill in sea water can be treated by a bacterium, explain the case study for the   7
            same? (CO5)

8-b.   Write down the basic steps involved in biosensing any compound via enzyme? (CO5)   7