Week 6 Assignment 1

The due date for submitting this assignment has passed. Due on 2018-03-07, 23:59 IST.

Submitted assignment

1) Enzymes can be reused by using
   - Isomerisation
   - Phosphorylation
   - Immobilization
   - Polymerisation

No, the answer is incorrect.
Score: 0
Accepted Answers: Immobilization

2) The selection of immobilization of cell or enzyme depends on
   - Preparation
   - Cost
   - Operational problem
   - All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: All of the above

3) The following enzyme is used for the estimation of glucose
   - Glucoamylase
   - Glucose oxidase
   - Invertase
   - Glucose isomerase

Score: 0
Accepted Answers: Glucose oxidase
The capsule is made up of a semi-permeable membrane. Effectiveness depends upon the stability of enzymes inside the capsule. Large quantity of enzyme can be immobilized. All of the above.

No, the answer is incorrect.
Score: 0
Accepted Answers:
All of the above

5) The immobilization technique which may be done without the solid matrix, is 1 point

- Cross linkage
- Matrix entrapment
- Covalent binding
- Adsorption

No, the answer is incorrect.
Score: 0
Accepted Answers:
Cross linkage

6) During immobilized enzymatic reaction, at steady state condition the rate of mass transfer is 1 point

- More than that of substrate consumption
- Equal to that of substrate consumption
- Less than that of substrate consumption
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Equal to that of substrate consumption

7) The example of organic solid matrix for the immobilization of the enzyme is 1 point

- Silica
- Collagen
- Alumina
- Titania

No, the answer is incorrect.
Score: 0
Accepted Answers:
Collagen

8) The binding between solid matrix and enzyme is comparatively less in case of 1 point

- Covalent
- Cross-linking
- Adsorption
- Ionic

No, the answer is incorrect.
Score: 0
Accepted Answers:
Adsorption

9) Immobilization by carrier binding includes

- Electrostatic
- Entrapment
- Encapsulation
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Electrostatic

10) Damkohler number ($N_Da$) is

- The ratio of the maximum reaction rate to the maximum mass transfer rate
- The ratio of the minimum reaction rate to the maximum mass transfer rate
- The ratio of the maximum reaction rate to the minimum mass transfer rate
- The ratio of the minimum reaction rate to the minimum mass transfer rate

No, the answer is incorrect.
Score: 0

Accepted Answers:
The ratio of the maximum reaction rate to the maximum mass transfer rate

11) If Damkohler number ($N_Da$) $>>1$, the enzymatic reaction rate may be expressed as follows

\[ (-r_S) = k_S a (S_b - S) \]

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(-r_S) = k_S a (S_b)$

12) To measure the extent to which the reaction rate is lowered because of resistance to mass transfer, the effectiveness factor of an immobilized enzyme, $\eta$ can be defined as

- Rate of Reaction / Rate of reaction with mass transfer limitation
- Rate of reaction with mass transfer limitation / Rate of reaction
- Rate of reaction when there is no mass transfer limitation / Rate of reaction when there is no mass transfer limitation
- Rate of reaction when there is no mass transfer limitation / Rate of Reaction

No, the answer is incorrect.
Score: 0

Accepted Answers:
Rate of reaction / Rate of reaction when there is no mass transfer limitation

13) Size of the pore of the solid matrix in case of immobilization of enzyme should be

- Same as that of enzyme
14) If the observable Thiele modulus is 10, then the immobilized system can be considered as
- Reaction significant
- External mass transfer significant
- Internal mass transfer significant
- Cannot be predicted

No, the answer is incorrect.
Score: 0
Accepted Answers:
Internal mass transfer significant

15) Activity of immobilized enzyme may be expressed as
- µmol of substrate converted per min per mg of protein
- µmol of substrate converted per min per mg of solid matrix
- µmol of substrate converted per min per mL of solid matrix
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
µmol of substrate converted per min per mg of solid matrix

16) The effectiveness factor increases with the
- Increase of diffusivity
- Increase of the particle size
- Decrease of the particle size
- Decrease of diffusivity

No, the answer is incorrect.
Score: 0
Accepted Answers:
Increase of diffusivity
Decrease of the particle size

17) In case of product inhibition following reactor is preferred
- CSTR
- PFR
- Fed-batch
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
18. In case of enzymatic reaction, the activation energy of the reaction

- Increases
- Decreases
- Constant
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Decreases

19. The volume needed to produce 1 kg of product per day by using the enzyme X (\(V_{max} = 1.5 \times 10^{-4} \text{ kg s}^{-1} \text{ m}^{-3}\)) biocatalyst; \(K_m = 5 \times 10^{-3} \text{ kg m}^{-3}\); \(Y_{P/S} = 1 \text{ kg kg}^{-1}\), degree of conversion = 99%, initial concentration of substrate 5 kg m\(^{-3}\), downtime=12 h)

- 0.176 m\(^3\)
- 0.576 m\(^3\)
- 1.76 m\(^3\)
- 17.6 m\(^3\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.176 m\(^3\)

20. The deactivation constant of an enzymatic reaction is 0.12 min\(^{-1}\). The half-life of the enzyme is

- 4.5 min
- 5.8 min
- 6.9 min
- 9.0 min

No, the answer is incorrect.
Score: 0
Accepted Answers:
5.8 min