

SEAT No. _____

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SARDAR PATEL UNIVERSITY

B.Sc. Semester- V Examination: December 2020

MICROBIOLOGY

US05CMIC24: Fermentation Technology-I

Time: 02 Hours 2:00 to 4:00 pm

Total marks: (70)

Instructions: (1) It is compulsory to attempt all four questions.

(2) Marks of each question are indicated on the right.

Q. 1 Answer the following multiple choice questions: (10)

1. Who defined fermentation as any anaerobic process through which microorganisms obtain energy for growth in absence of O_2 .
(a) Edward Jenner (b) Louis Pasteur
(c) Robert Koch (d) Paul Ehrlich
2. Secondary metabolites production is very common in _____.
(a) The filamentous bacteria (b) Fungi
(c) The spore forming bacteria (d) All of these
3. Which technique is largely used for primary screening of growth factors producing microorganisms?
(a) Auxanography technique (b) Crowded plate technique
(c) Serial dilution technique (d) None of these all
4. Sulfite waste liquors from coniferous trees have a total sugar content of _____.
(a) 5 – 10 % (b) 20 – 30 %
(c) 2 – 3 % (d) 15%
5. Sodium bisulphite is used as _____ in glycerol production.
(a) Inducer (b) Inhibitor
(c) Precursor (d) Source of carbon
6. _____ is a measure of the fractional reduction in viable organism count produced by a certain heat and time regime.
(a) Del factor (b) Death factor
(c) Death coefficient (d) Quality criterion
7. Which of the following is an example of most commonly used fermenter?
(a) Tower fermenter (b) Airlift fermenter
(c) Loop Reactor (d) Stirred Tank bioreactor
8. _____ is used as a measure of the aeration capacity of a fermenter.
(a) $C^* - CL$ (b) KLa
(c) KL (d) DOT

9. Which of the following process is useful in one step enrichment and concentration of product from fermentation broth?
- (a) Precipitation (b) Foam separation
(c) Centrifugation (d) None of these all
10. In many fermentation processes, _____ techniques are used to isolate and purify relatively low concentrations of metabolic products.
- (a) Centrifugation (b) Solvent extraction
(c) Chromatography (d) Foam separation

Q. 2. Fill in the Blanks and True- False:

(08)

- _____ is used as a motor car fuel when blended with petroleum.
- _____ is used in the primary screening of organic acid producing microorganisms.
- _____ is a process by which metabolically active cell culture is produced for fermentation process.
- Deterioration of quality of a culture medium and high energy consumption are disadvantages of batch sterilization. (True or False)
- In sodium sulphite oxidation technique, the sulphite oxidation rate is equivalent to the oxygen-transfer rate. (True or False)
- In batch fermentation, non-productive phase is called _____.
- During filtration, the use of filter aids is not necessary to improve filtration rates. (True or False)
- In liquid-liquid extraction, if the value of K is very low than the extraction of product is done by _____.

Q. 3. Answer the following questions in very short: (Attempt any ten)

(20)

- Give four examples of industrial applications of enzymes.
- Explain the term biotransformation with suitable example.
- Define: Screening.
- Enlist most commonly used nitrogen sources in fermentation media.
- What are precursors? Give suitable example.
- Give any four examples of industrially important enzyme inducers.
- What is continuous fermentation?
- What are advantages of air lift fermenter?
- Enlist the factors affecting value of KLa.
- Enlist the main stages of Downstream Processing.
- Which agents are used in precipitation of the compound of interest?
- Draw diagram of a multi chamber centrifuge.

Q. 4. Answer the following long questions: (Attempt any four)

(32)

- (A) Discuss in detail characteristics of industrially important microorganisms.
- (B) Explain significance of secondary screening.
- (C) Discuss in detail about carbon sources used in fermentation media.
- (D) Describe continuous sterilization of fermentation media.
- (E) Draw neat diagram of a typical stirred tank fermenter, label it and give functions of each part in brief.
- (F) Describe mass transfer of oxygen and also discuss methods of its determination.
- (G) Discuss in detail separation of cells and solids by filtration.
- (H) Discuss the techniques used for the disruption of microbial cells.

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