

[A-14]

SEAT No. _____

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SARDAR PATEL UNIVERSITY
M. Sc. Integrated Biotechnology (IG-IBT) 7th Semester
Theory Exam – March 2019
PS07CIGIB3 – Fermentation technology
20th March 2019 (Wednesday), 2:00 pm to 5:00 pm

Maximum Marks: 70

Note: (1) All the Questions are compulsory. (2) Figures on the right indicate marks.

1 × 8 = 8

Q.1 Choose the correct option

- (i) Which of these is not a component of fermenter?
[A] Agitator [B] Heat exchanger
[C] baffles [D] sparger
- (ii) Find out odd one out _____
[A] Gassing out technique
[B] Sulphite oxidation method
[C] Dichromate method
[D] Oxygen balance technique
- (iii) The Scaba 6SRGT, the prochem Maxflo T, the lightning A315 and the Ekato Intermig which are the modern agitators derived from _____
[A] Disc turbines [B] Vaned disc
[C] Open turbines of variable pitch [D] marine propellers
- (iv) Deindoerfer and Humphrey (1959) used the term $ln \frac{N_0}{N_t}$ as a design criterion for sterilization, which has been also called the _____.
[A] Delta factor [B] Del factor
[C] Rho factor [D] Gamma factor
- (v) Some chemicals, when added to certain fermentations, are directly incorporated into the desired product are called _____.
[A] Buffers [B] Inhibitors
[C] Inducers [D] Precursors
- (vi) AISI 317 grade stainless steel containing _____ are used in fermenter construction which is to be used in citric acid production
[A] 18% Cr + 10% Ni + 3 to 4% Mo [B] 18% Cr + 10% Ni + 2 to 2.5% Mo
[C] 18.5% Cr + 10% Ni [D] 18% Cr + 10% Ni + 1 to 1.5 % Mo
- (vii). The specific oxygen uptake rate increases with increase in the dissolved oxygen concentration up to certain point is referred to as _____.
[A] Static method [B] shaking method
[C] C_{crit} [D] V_{max}
- (viii). _____ are surface active agents, reducing the surface tension in the foam and destabilizing protein film.
[A] Precursor [B] Antifoam agents
[C] Inducers [D] Chelators

(1)

(P.T.O)

- 04/TAJ2
- Q.2. Attempt any Seven of the following 2 × 7 = 14
- (a) Enlist the range of fermentation processes with suitable examples.
 - (b) Write the component parts of a fermentation process.
 - (c) Define the terms: (i) fed batch fermentation (ii) chemostat
 - (d) Write the steps for transfer of O₂ from air to cell by Bartholomew et al.
 - (e) What are functions of Impeller?
 - (f) List out advantages of continuous sterilization over batch sterilization.
 - (g) Role of baffles in fermenter
 - (h) Write about different types of sensor in relation to its application for process control
 - (i) Enlist different precursors and inducers used for media optimization.
- Q. 3. [A] Explain in detail various carbon sources used in fermentation medium and Factors influencing the choice of carbon source. [06]
- [B] Write a note on media optimization by Plackett Burman design. [06]
- OR**
- Q. 3. [B] Discuss the stages in the chronological development of the fermentation industry [06]
- Q. 4. [A] Explain the structure & components of fermenter in detail with suitable diagram. [06]
- [B] Give an brief account on: (1) Airlift fermenter [03]
- (2) Tower fermenter [03]
- OR**
- Q. 4. [B] Discuss in detail batch sterilization of media. [06]
- Q. 5. [A] Explain Sulphite oxidation technique for determination of K_{La} [06]
- [B] Define fluid rheology. List out different types of rheology and write about any two. [06]
- OR**
- Q. 5. [B] Explain product kinetics of batch culture in detail. [06]
- Q. 6. [A] What is the importance of measuring temperature in fermentation? Enlist various methods to measure the temperature and describe the methods used to control the temperature. [06]
- [B] Write a note on components of a computer linked system. [06]
- OR**
- Q. 6. [B] Write a note on PID controller. [06]