

(A-23) Seat No.: \_\_\_\_\_

No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**  
M. Sc. Integrated Biotechnology (IG-IBT) 7<sup>th</sup> Semester  
Theory Exam – October 2016  
PS07CIGIB3 – Fermentation technology  
22<sup>nd</sup> October 2016 (Saturday), 2:00 pm to 5:00 pm

Maximum Marks: 70

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

- Q.1 Choose the correct option 1x8= 8
- (i) The computer control involves process control of parameters, where the sensors are directly interfaced to a computer (DDC). What is the fullform of DDC?  
[A] Direct data control [B] digital data control  
[C] digital depth control [D] direct digital control
- (ii) The continuous culture are not widely used in industry because \_\_\_\_\_  
[A] They are not suited for the production of secondary metabolites  
[B] Contamination and mutation can have disastrous effect on the operation  
[C] the government will not approve the licensing of pharmaceuticals produced in continuous culture  
[D] All of the above
- (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

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- Q.2. Attempt any Seven of the following 2x7= 14
- (a) Enlist different precursors and inducers used for media optimization.
  - (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 O<sub>2</sub> 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) Draw a simple manual control loop for temperature control.
  - (h) Write about different types of sensor in relation to its application for process control
  - (i) Enlist the range of fermentation processes with suitable examples.
- Q. 3. [A] Discuss in detail various nitrogen sources used in fermentation medium and Factors influencing the choice of nitrogen source. [06]
- [B] Write a note on Media optimization for the fermentation. [06]
- OR**
- Q. 3. [B] Discuss in detail 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) Bubble column fermenter [03]
- OR**
- Q. 4. [B] Explain in detail continuous sterilization of media. [06]
- Q. 5. [A] Discuss gassing out techniques for determination of K<sub>L</sub>a [06]
- [B] Explain product kinetics of batch culture in detail. [06]
- OR**
- Q. 5. [B] Define fluid rheology. List out different types of rheology and write about any two. [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 pressure measurement and control. [06]
- OR**
- Q. 6. [B] Write a note on components of a computer linked system. [06]

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