

(A-46)

SEAT No. _____

No. of printed page: [02]

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SARDAR PATEL UNIVERSITY
M. Sc. Integrated Biotechnology (IG-IBT) 7th Semester
Theory Exam – April 2018
PS07CIGIB3 – Fermentation technology
30th April 2018 (Monday), 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) Which of the following is best to sterilize heat labile solutions?
[A] Dry heat [B] Autoclave
[C] Pasteurization [D] Membrane filtration
- (ii) Low dissolved oxygen concentration leads to _____
[A] Low biomass yields [B] High biomass yields
[C] No effect on biomass yields [D] None of the above
- (iii) A culture system with constant environmental conditions maintained through continual provision of nutrient and removal of wastes is called _____.
[A] Batch culture [B] Continuous culture
[C] Fed batch culture [D] None of these
- (iv) Prokaryotic microorganisms used in fermentation process include _____.
[A] protozoa [B] fungi
[C] bacteria [D] All of these
- (v) Yield coefficient represents _____.
[A] Total biomass or product produced.
[B] Conversion efficiency of a substrate into product
[C] Conversion rate of a substrate into biomass or product
[D] Production time of biomass or product
- (vi) Main reason for using baffles in stirred tank reactors are _____.
[A] Baffles permit turbulence conditions to arise the low stirrer speed.
[B] Baffles will allow axial mixing to occur even with radial flow impellers.
[C] Both (A) & (B).
[D] None of the above.
- (vii) In fermenter, pressure is measured using _____.
[A] Barometer [B] Thermometer
[C] Hygrometer [D] Bourdon tube pressure gauge
- (viii) In order to obtain the desired product in high amounts, it is essential to _____.
[A] Maintain the right physiochemical conditions
[B] Formulate the right media
[C] Remove inhibiting compounds
[D] All of the above

(1)

P.T.O.

Q.2. Attempt any Seven of the following

2x7 = 14

- (a) Enlist the type of impellers and aerators.
- (b) Write a role of inducers in media with example.
- (c) Define the terms Aseptic operation and containment.
- (d) Write about basic functions of fermenter.
- (e) Define the terms: absolute filters and depth filters.
- (f) Enlist criteria for selection of antifoam agent.
- (g) Describe manual control system with suitable example.
- (h) Enlist type of aseptic seals for agitation shaft.
- (i) What are gateway sensors? Give one example about Information that may be Determined from the Sensor Signal.

Q. 3. [A] Discuss in detail the Chronological development of fermentation industry [06]
[B] Discuss in detail various nitrogen sources used in fermentation medium and factors influencing the choice of nitrogen source. [06]

OR

Q. 3. [B] Enlist range of fermentation processes. Discuss production of microbial metabolites in detail. [06]

Q. 4. [A] Draw a schematic diagram of Waldhof and air lift fermenter and explain them in brief. [06]

[B] Explain in detail Sterilization of air by filtration. [06]

OR

Q. 4. [B] Explain in detail batch sterilization of media with Kinetics of medium sterilization. [06]

Q. 5. [A] Explain in detail batch culture, fed-batch culture and continuous culture. [06]

[B] Discuss in detail scale up and scale down in fermentation process. [06]

OR

Q. 5. [B] Enlist various methods of K_{La} determination. Discuss gassing out technique for determination of K_{La} . [06]

Q. 6. [A] Discuss on equipments for flow rate measurements. [06]

[B] Enlist and discuss different types of automatic control. [06]

OR

Q. 6. [B] Enlist different type of automatic control. Explain proportional and integral control in detail. [06]

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2