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SARDAR PATEL UNIVERSITY

M.Sc. Examination - April 2015

M. Sc. Integrated Biotechnology (IGBT) - 6th Semester

Saturday, 25th April 2015

Session: Evening Time: 2:30 pm to 5:30 pm

Subject / Course code:- PS06CIGB03

Subject / Course Title:- Industrial Microbiology (New)

Maximum Marks: 70

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

Q.1 Choose the correct option **1 x 8 = 08**

(i) Chemical name of citric acid is _____

(a) ethanedioic acid (b) 1-Hydroxypropane-1,2,3-tricarboxylic acid

(c) 2-Hydroxybutanedioic acid (d) 2-Hydroxypropane-1,2,3-tricarboxylic acid

(ii) Yoshida *et al.* (1973) introduced the term _____ to describe batch cultures which are fed continuously, or sequentially with medium, without the removal of culture fluid.

(a) Batch culture (b) Fed Batch culture

(c) Continuous culture (d) Solid state fermentation

(iii) The volumetric mass transfer coefficient, K_La has the unit _____.

(a) $cm^2 h^{-1}$ (b) cm^2/cm^3 (c) h^{-1} (d) cm / dm^3

(iv) Some chemicals, when added to certain fermentations, are directly incorporated into the desired product are called_____.

(a) Buffers. (b) Inhibitors. (c) Inducers. (d) Precursors.

(v) Which one of the following is the example of In-Line sensor?

(a) Ion specific sensor (b) mass spectrophotometer

(c) Antifoam probes (d) tachometers

(vi) Microorganisms produce secondary metabolites like antibiotics usually during _____phase of growth.

(a) Lag phase (b) Tropophase (c) Idiophase (d) Death phase.

(v) Deindoerfer and Humphrey (1959) used the term In No/Nt as a design criterion for sterilization, which has been also called the_____.

(a) Del factor. (b) Delta factor. (c) Rho factor (d) Gamma factor

(viii) _____is the preservation method in which the freezing of a culture followed by its drying under vacuum, which results in the sublimation of the cell water.

(a) Soil stocks (b) Lyophilization (c) Agar slopes (d) Glycerol stocks

Q.2. Attempt any seven of the following: **2 x 7 = 14**

1. Enlist the applications of Amylase.
2. Write the ideal characteristics of fermentation medium.
3. Explain the terms primary and secondary metabolites.
4. Enlist the characteristics of industrially important microorganisms.
5. Enlist the uses of Citric acid.
6. Explain the function of baffles.
7. Define batch culture and continuous culture fermentation process
8. Enlist the devices used in pressure measurement.
9. Measurement and control of Temperature.

Q. 3. (a) Discuss in detail the Crowded plate and auxanography technique. **[06]**

(b) Discuss with suitable examples for the isolation of induced mutant producing improved yields of primary metabolites. **[06]**

OR

Q. 3. (b) Enlist various methods of preservation of industrially important microorganisms. Explain any two methods in detail. **[06]**

Q. 4. (a) Discuss in detail the crude carbon sources used in fermentation medium and factors affecting choice of carbon and nitrogen sources in fermentation medium. **[06]**

(b) Explain the design of continuous sterilization process with labelled diagram. Write advantages of continuous sterilization over batch sterilization. **[06]**

OR

Q. 4. (b) Explain mechanisms of filter sterilization and discuss the classification of filters with their advantages and disadvantages. **[06]**

Q. 5. (a) Explain the various functions of fermenter and describe the body construction of a fermenter. **[06]**

(b) Give an account on components involved in aeration and agitation. **[06]**

OR

Q. 5. (b) What is K_La? Enlist various methods used for determining K_La. Explain sulphite oxidation method in detail. **[06]**

Q. 6. (a) Discuss in brief on surface, solid state and submerged fermentation. **[06]**

(b) Write a note on recovery of citric acid from the fermented broth. **[06]**

OR

Q. 6. (b) Discuss in brief on amylase production by fermentation. **[06]**

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