

SARDAR PATEL UNIVERSITY
CLASS: M. Sc. (Home Science) (FBT) (III SEMESTER)
COURSE: PH03CFBT01/02: FUNDAMENTALS OF INDUSTRIAL MICROBIOLOGY AND
BIOCHEMICAL ENGINEERING
WEDNESDAY, 12, DECEMBER, 2012 MAX. MARKS: 70
TIME: 2:30 p.m TO 5:30 p.m.

NOTE: ALL QUESTIONS ARE COMPULSORY
FIGURES ON THE RIGHT INDICATES MARKS

Q. 1. Multiple choice questions

(08)

- Mutagenesis by chemical agents can be classified according to their mode of action:
 - Mutagens which affect nonreplicating DNA.
 - Base analogs which are incorporated into replicating DNA due to their structural similarity.
 - Frame shift mutagens which enter into DNA during replication.
 - All of the above.
- Detection and isolation of high yielding strains from natural resources such as soil, containing a heterogenous microbial population is called _____
 - Fermentation
 - Inoculum
 - Screening
 - none of these.
- An agitator is required to achieve _____ objectives.
 - Bulk fluid and gas phase mixing
 - air dispersion
 - oxygen transfer
 - All of these
- Dissolved oxygen is measured with _____.
 - Polarographic electrodes
 - galvanic electrodes
 - Calomel electrodes
 - both a & b
- _____ effects the $K_L a$.
 - Medium Rheology
 - Sterilization
 - Aeration
 - both a & c
- The separation of a component from a liquid mixture by treatment with solvent in which the desired component is preferentially soluble is called _____.
 - Solid-liquid extraction
 - liquid-liquid extraction
 - centrifugation
 - none of these.
- Cultures used to inoculate an industrial fermentation media should satisfy _____.
 - Must be available in sufficient large quantities
 - Must be in a suitable morphological form.
 - Must retain product forming capabilities
 - Must be free from contamination
 - All of these.
- The parasexual mechanism established in vivo in bacteria include:
 - Transformation
 - Transduction
 - Conjugation
 - All of these.

Q. 2. Answer any Seven

(14)

1. Define mutation and how can you bring about induced mutation.
2. Enlist the criteria for industrially important microorganisms.
3. Maintenance of dissolved oxygen at a concentration above $C_{critical}$ is necessary - comment
4. Volumetric mass transfer coefficient is used as a measure of aeration efficiency. Justify
5. Enlist the criteria used for inoculum development.
6. Differentiate between different types of dryers used in downstream processing.
7. Define bioreactor and write the advantages of bubble column reactor.
8. Differentiate between batch and fed batch fermentation.
9. What are the advantages of batch versus continuous sterilization?
10. What is feed back inhibition and feed back repression?

Q.3. (a) Describe Secondary Screening. And explain why it is qualitative and quantitative in approach.

(06)

(b) Explain Replica plating and gradient plate method for the isolation of mutants. (06)

OR

Q.3. (a) What is strain improvement why is it necessary and how would you improve the strain by using parasexual cycle and protoplast fusion. (08)

(b) Write a note on Auxanography. (04)

Q.4. (a) Define inoculums and explain in detail the inoculums development for fungi and bacteria. (08)

(b) Write a note on Kinetics of Batch fermentation. (04)

OR

Q.4. With a help of neat diagram explain the criteria, design and function of each component in detail. (12)

Q.5. (a) Write a note on scale-up. (05)

(b) Write a note on sterilization of medium (07)

OR

Q.5. What is K_{La} and describe the various methods used for the measurement of K_{La} . (12)

Q.6. Explain the methods of cell separation in detail. (12)

OR

Q.6 (a) Discuss entrapment and adsorption as a method of immobilization and enlist the advantages of immobilized whole cells over free cells. (08)

(b) Discuss product recovery by multistage solvent extraction system. (04)