

3 Hours

Total Marks: 100

1. Attempt **all** questions.
2. **All** questions carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculators** is **allowed**.

Q.1 a. Select the correct alternative: (Any Six)**06**

1. The pasteurization equipment is designed in such a way that every particle of milk or milk products is _____ at a specific temperature and time duration.
 - a) Heated
 - b) Agitated
 - c) Mixed
 - d) Cooled
2. Milk secreted from the udders of cows has a pH around _____.
 - a) 2.7
 - b) 4.8
 - c) 6.8
 - d) 10.1
3. Which of the following pathogenic microorganisms is responsible for putrefaction of milk turning it as ropy or slimy?
 - a) *Streptococcus cremoris*
 - b) *Serratia marcescens*
 - c) *Pseudomonas synchyanea*
 - d) *Alcaligenes viscolactis*
4. The presence of *Clostridium* species in fresh milk indicates _____.
 - a) Freshness of milk
 - b) Staleness of milk
 - c) Pasteurization of milk
 - d) Excessive contamination with soil or dung
5. Which of the following is one of the disadvantages of the direct count method?
 - a) It is simple and less time consuming
 - b) Different morphological types may be distinguished
 - c) It can not be applied to pasteurized milk
 - d) Slides can be kept for permanent record
6. The milk may be preserved in refrigeration and pasteurization for a limited time, as well as by _____ for a longer shelf life.
 - a) Hydration
 - b) Addition of preservatives
 - c) Low humidity
 - d) Dehydration

7. _____ and *Streptococcus lactis* are used as a starter culture in Cheddar cheese production.
- Lactobacillus bulgaricus*
 - Propionibacterium shermanii*
 - Streptococcus thermophilus*
 - Streptococcus cremoris*
8. _____ produces hydrogen sulphide gas in negligible amounts which makes the cheese flavourful.
- Lactobacillus casei*
 - Escherichia coli*
 - Saccharomyces cerevisiae*
 - Penicillium roqueforti*
9. _____ can be used as a sweetener in yogurt production.
- Gelatin
 - Carboxymethyl cellulose
 - Corn sweeteners
 - Guar gum

Q.1 b. Answer the following questions: (Any Two)

14

- Describe the factors affecting bacteriological quality of milk.
- Explain the manufacturing process of butter.
- Elaborate on fundamental steps involved in cheese manufacturing.

Q.2 a. Select the correct alternative: (Any Six)

06

- The materials made surface active and collected are termed _____.
 - colligends
 - collectors
 - surfactants
 - filter aids
- _____ is an example of non-ionic polymer.
 - Proteins
 - Cellulose
 - Polyethylene glycol
 - Surfactant
- _____ is an example of flocculating agents.
 - Alum
 - Sodium lauryl sulphate
 - Kieselguhr
 - Sodium dodecyl sulphate

4. _____ is a centrifuge for a slurry up to 5% solids of particle size 0.1 to 200 μm diameter.
 - a) Tubular bowl
 - b) Multi Chamber
 - c) Basket
 - d) Decanter
5. Lyophilization is also called as _____.
 - a) Storage under liquid nitrogen
 - b) Cryopreservation
 - c) Freeze drying
 - d) Spray drying
6. Anionic ion exchange resins normally contain a _____ active group..
 - a) sulphonic acid
 - b) phosphonic acid
 - c) carboxylic acid
 - d) secondary amine
7. _____ chromatographic method utilizes a solid phase (e.g. silica) which is modified to replace hydrophilic groups with hydrophobic alkyl chains.
 - a) Ion exchange
 - b) Affinity
 - c) Reverse phase
 - d) Gel permeation
8. _____ chromatography involves binding of the solute to the solid phase primarily by weak Van der Waals forces.
 - a) Affinity
 - b) Adsorption
 - c) Gel permeation
 - d) Ion exchange
9. _____ filter consists of a rotating, hollow, segmented drum covered with a fabric or metal filter which is partially immersed in a trough containing the broth to be filtered.
 - a) Cross-flow
 - b) Plate and frame
 - c) Pressure leaf
 - d) Rotary vacuum

Q.2 b. Answer the following questions: (Any Two)

14

1. Discuss -Continuous filtration methods used in downstream processing.
2. Describe the different steps in downstream processing.
3. Elaborate on the role of affinity and gel permeation chromatography in the recovery and purification of the product.

Q.3 a. Select the correct alternative: (Any Six) 06

1. _____ is the situation where laboratory or pilot scale experiments are conducted under conditions that mimic the industrial scale conditions.
 - a) scale-up
 - b) scale-down
 - c) production scale
 - d) troubleshooting
2. One of the features possessed by a strain of yeast used for alcohol fermentation
 - a) high tolerance to alcohol
 - b) variable biochemical properties
 - c) slow growing
 - d) less tolerant to osmotic pressure
3. The pH of streptomycin fermentation medium rises to about 8 in the first phase due to production of _____.
 - a) ammonia
 - b) acetic acid
 - c) citric acid
 - d) dil HCl
4. _____ is used as a precursor for penicillin G.
 - a) Phenyl acetic acid,
 - b) Phenoxy acetic acid,
 - c) Phenoxy amino acid,
 - d) Phenyl alcohol
5. Short method of button mushroom compost preparation requires _____ days.
 - a) 14-18 days
 - b) 8-10 days
 - c) 2-6 days
 - d) 20-35 days
6. Which chromatographic technique is used to recover L-Lysine from fermentation broth?
 - a) Adsorption chromatography
 - b) Ion-exchange chromatography
 - c) Gel-permeation chromatography
 - d) Affinity chromatography
7. _____ process utilizing *Corynebacterium glutamicum* is mainly adopted to produce L-glutamic acid on a large scale.
 - a) one-stage process
 - b) two-stage process
 - c) multi-stage process
 - d) three-stage process

8. _____ is an example of semisynthetic penicillin.
- Ampicillin
 - Tetracycline
 - Polymyxin
 - Streptomycin
9. _____ are used as inoculum for fungal fermentations.
- cells
 - Spores
 - Mycelium
 - biomass

Q.3 b. Attempt the following: (Any Two) 14

- Write a detailed flow sheet with significance in the commercial production process of penicillin along with the bio parameters to be controlled.
- What are the general principles of inoculum development? Explain the procedure of inoculum development of bacteria.
- Explain the production of alcohol considering strain employed and raw materials for production.

Q.4 a. Do as directed: (Any Six) 06

- Define: Pyrogen
- Perquisites of a manufacturing process are listed. Find the incorrect one:
 - clean air
 - production in an open system to reduce cost
 - production in a closed system
 - dust-free environment
- Raw materials of _____ origin, require careful storage to prevent growth of the organisms and spoilage of the material
 - Inorganic
 - Mineral
 - Natural
 - Metal
- Test for _____ involves taking samples at random and testing for presence of microorganisms.
 - Potency
 - Efficiency
 - Sterility
 - Pathogenicity
- _____ should be used at junctions between walls and floors or ceilings.
 - Windows
 - Vents
 - Coving
 - Pipes

6. Name any one detergent used for disinfecting skin before entering an aseptic area.
7. _____ cycle includes the acquisition of all raw materials, their processing into a final product, and subsequent packaging and distribution.
 - a) Quality assurance
 - b) Quality control
 - c) Manufacturing
 - d) Packaging
8. Regular microbiological monitoring should be carried out to determine the efficacy of _____ procedures.
 - a) disinfection
 - b) Sterilization
 - c) Manufacturing
 - d) Fabrication
9. State whether the statement is true or false. "The term quality is usually taken to mean fitness for purpose".

Q.4 b. Give an account of the following questions: (Any Two)

14

1. Environmental grades and manufacturing operations.
2. Environmental cleanliness and Quality of starting materials are important factors affecting the manufacture of sterile products.
3. Requirements of sterile products manufacturing unit.

Q.5 Write Short notes on the following: (Any Four)

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- a. Normal flora of milk
 - b. Sundae style yogurt
 - c. Recovery of citric acid
 - d. Nutritional value of Mushroom
 - e. Hazard Analysis critical control point
 - f. Aspects of Quality assurance
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