

B.Sc. Biotechnology
SUBJECT: USBT 306 Bioprocess Technology
SEMISTER – III
SAMPLE QUESTIONS

Unit I

1. “Each batch of newly preserved cultures should be routinely checked to ensure their quality”. Who outlined the statement?
 - a) Lincoln
 - b) Snell
 - c) Malik
 - d) Pridham

2. Which of the following is/are used in dried culture preservation?
 - a) Sand
 - b) Soil
 - c) Sand and Soil
 - d) Slits

3. Which of the following is NOT the advantage of lyophilization?
 - a) Dissolution of product
 - b) Processed in aseptic conditions
 - c) Handling and processing time increases
 - d) Do not use heat

4. During the preservation of microbial cell culture _____
 - a) metabolism stops
 - b) metabolism continues
 - c) metabolism changes
 - d) physiology changes

5. Which of the following plate is used to detect and isolate organic acid producers?
 - a) Phenol red plate
 - b) Potato Dextrose Agar plate
 - c) MacConkey’s Agar plate
 - d) Rose Bengal Agar plate

6. A test tube contains 9ml distilled water. 1g of soil is added to that test tube and the soil is allowed to settle down. Now, 1ml of that stock solution is taken and transferred to the 2nd test tube containing 9ml of distilled water. The process is repeated several times until the

requirement is met. For this dilution, it may be said that the solution was diluted _____

- a) 100-fold
- b) 10-fold
- c) 1000-fold
- d) 2-fold

7. Which of the following method is useful for detection and isolation of those microorganisms which are capable of growing on a particular nutrient medium?
- a) Crowded plate technique
 - b) Auxanographic technique
 - c) Enrichment Culture technique
 - d) Indicator dye technique
8. Which scientists gave the details of the techniques of preservation?
- a) Jacob and Monod
 - b) Kirsop and Doyle
 - c) William and Wilkins
 - d) Boliver and Rodriguez
9. Which of the following is NOT the technique of preservation?
- a) storage on agar slants
 - b) storage under liquid nitrogen
 - c) dried cultures
 - d) storage in water
10. The preservation of agar slopes has an expiration of 6 months and the agar needs to be changed every 6 months. Which of the following can be used to extent sub-culturing to one year?
- a) Paraffin oil
 - b) DMSO
 - c) Glycerol
 - d) Loamy Soil
11. What is the temperature of liquid nitrogen (°C)?
- a) -150°C
 - b) -122°C
 - c) -194°C
 - d) -196°C
12. Which of the following is NOT a cryoprotective agent?
- a) DMSO
 - b) Glycerol
 - c) Ethylene Glycol
 - d) Paraffin wax

13. The preservation by liquid Nitrogen is called as _____
- Cryopreservation
 - Lyophilization
 - Freeze-drying
 - Desiccation
14. Which of the following method involves sublimation of cell water?
- Cryopreservation
 - Lyophilization
 - Dried Culture
 - Desiccation
15. Which of the following enzyme is used in the process of bating?
- invertase
 - pectinase
 - amylase
 - protease
16. Which of the following is NOT a criterion for the choice of an organism?
- The organism must be genetically stable
 - The organism must be able to produce a high yield of product
 - The optimum temperature for the growth of an organism must be above 50°C
 - The organism must be able to grow in an easily available nutrient medium
17. Which of the following method is not used in isolation and screening of desired microorganisms?
- Crowded plate technique
 - Auxanographic technique
 - Enrichment Culture technique
 - Hanging Drop technique
18. Which of the following method is useful for the isolation and detection of organisms having the ability to produce antibiotics?
- Crowded plate technique
 - Auxanographic technique
 - Enrichment Culture technique
 - Indicator dye technique
19. Which of the following shows the zone of inhibition when a particular organism is grown on a Petri plate?
- Growth Factor producers
 - Antibiotic producers
 - Organic acid producers
 - Amino acid producers

20. Which of the following method is useful for isolation and detection of organisms having the ability to produce growth factors?
- a) Crowded plate technique
 - b) Auxanographic technique
 - c) Enrichment Culture technique
 - d) Indicator dye technique
21. Which of the following method is useful for isolation and detection of organisms having the ability to produce organic acids?
- a) Crowded plate technique
 - b) Auxanographic technique
 - c) Enrichment Culture technique
 - d) Indicator dye technique
22. What is the pH range of Bromophenol blue?
- a) 3.0 – 4.6
 - b) 8.0 – 10.0
 - c) 5 – 8
 - d) 6.4 – 8.0
23. Which of the following method proceeds with 2-plate preparation?
- a) Crowded plate technique
 - b) Auxanographic technique
 - c) Enrichment Culture technique
 - d) Indicator dye technique
24. Which of the following dye is colourless at acidic pH and becomes red at basic pH?
- a) Methyl red
 - b) Thymol blue
 - c) Phenolphthalein
 - d) Phenol red
25. Which of the following is not a desired characteristic of the organism to be used for industrial application?
- a) should produce less amount of product
 - b) should be readily available
 - c) should grow rapidly
 - d) should be non-pathogenic
26. Solvents and enzymes are found in which of the following categories of microbial products?
- a) Pharmaceutical chemicals
 - b) Commercially valuable chemicals
 - c) Food supplements
 - d) Alcoholic beverages

27. Insulin was isolated from which of the following organs of animals?
- small intestine
 - tongue
 - pancreas
 - stomach
28. Which of the following yeast is used for the production of riboflavin?
- Saccharomyces cerevisiae*
 - Eremothecium ashbyi*
 - Saccharomyces rouxii*
 - Candida utilis*
29. Which among the following are not used as raw materials for alcohol production?
- corn
 - molasses
 - whey
 - grapes
30. What is the pH required for the production of baker's yeast?
- 1 to 2
 - 4 to 5
 - 7 to 8
 - 10 to 12
31. Which of the following instrument is used for the recovery of yeast cells?
- fermenter
 - centrifuge
 - filter press
 - mash storage
32. Which of the following yeast can be used to produce microbial protein?
- Saccharomyces cerevisiae*
 - Candida milleri*
 - Eremothecium ashbyi*
 - Candida utilis*
33. Gluconic acid is produced by which of the following molds?
- Aspergillus niger*
 - Rhizopus nigricans*
 - Aspergillus terreus*
 - Rhizopus oryzae*
34. Fermentation of rice is carried out by which of the following microorganisms?
- bacteria
 - yeasts

- c) molds
- d) protozoa

Unit II

1. Which of the following is the first step in Fermentation Technology?
 - a) Media Formulation
 - b) Isolation of microbes
 - c) Constructing of fermenter
 - d) Preservation of microbes

2. Which of the following instrument works on the principle of batch sterilization?
 - a) Incubator
 - b) Autoclave
 - c) Centrifuge
 - d) LAF

3. The highest feasible temperature for batch sterilization is _____
 - a) 124°C
 - b) 120°C
 - c) 122°C
 - d) 121°C

4. The destruction of microorganisms by moist heat is described by _____
 - a) Zero-order reaction
 - b) First-order reaction
 - c) Third-order reaction
 - d) Second-order reaction

5. Which of the following reaction occurs during the sterilization which results in browning of media?
 - a) Sandmeyer reaction
 - b) Maillard reaction
 - c) Cannizzaro reaction
 - d) Gattermann reaction

6. The long exposure of batch sterilization may lead to _____
 - a) Purification of media
 - b) Recovery of media
 - c) Degradation
 - d) Good quality of product

7. Which scientists introduced the term 'Del factor'?
- Deindoerfer and Humphrey
 - Jacob and Monod
 - Banks and Corbett
 - Richards
8. What is the advantage of batch sterilization over continuous sterilization?
- Superior maintenance of medium quality
 - Ease of scale-up
 - Automatic control
 - Lower equipment costs
9. The Del Factor decreases as the initial number of organisms _____
- Decreases
 - Increases
 - Remains constant
 - Becomes zero
10. How long does it take for the autoclave to complete its cycle?
- 30-35 minutes
 - 50 min to 1 hr
 - 15-20 minutes
 - 10-15 minutes
11. Which of the following is a type of continuous sterilizer?
- Steam Injector
 - Inertial Impaction
 - Electrostatic attraction
 - Interception
12. The sterilization in double spiral heat exchanger is done through _____
- Countercurrent mechanism
 - Counter mechanism
 - Symporter mechanism
 - Antiporter mechanism
13. Which of the following organism can grow with or without oxygen?
- Obligate aerobes
 - Facultative anaerobes
 - Obligate anaerobes
 - Aerotolerant anaerobes

14. Magnesium is required in the medium for _____
- a) Membrane stabilization
 - b) Production of ATP
 - c) Membrane structure and function
 - d) Amino acid synthesis
15. Which of the following media consists of a few components which are poorly specified?
- a) Natural media
 - b) Synthetic media
 - c) Complex media
 - d) Semi-synthetic media
16. Which of the following is not a Carbon source?
- a) Blackstrap molasses
 - b) Corn molasses
 - c) Beet molasses
 - d) Yeast extract
17. Which of the following is a by-product after starch extraction from maize?
- a) Blackstrap molasses
 - b) Hydrol molasses
 - c) Corn steep liquor
 - d) Beet molasses
18. Glucose molecule during the process of glycolysis is broken down into _____.
- a) Four pyruvic acid
 - b) Three pyruvic acid
 - c) Two pyruvic acid
 - d) One pyruvic acid
19. Fermentation occurs in the _____.
- a) presence of oxygen
 - b) absence of oxygen
 - c) presence of nitrogen
 - d) presence of carbon
20. The least yield of ATP is observed in _____.
- a) aerobic respiration
 - b) anaerobic respiration
 - c) fermentation
 - d) same in all
21. Which of the following mineral is not required for microorganism?
- a) Pb
 - b) K
 - c) S
 - d) Mg

22. Which of the following resists the change in pH?
- a) Buffer
 - b) Growth factors
 - c) Minerals
 - d) Inhibitors
23. Which of the following is an example of a chelating agent?
- a) Magnesium
 - b) EDTA
 - c) Ca
 - d) Glycerol
24. Which of the following is used to produce a cooling effect on the vessel?
- a) Baffles
 - b) Sparger
 - c) Impeller
 - d) Stirrer glands
25. What is the basic function of the fermenter?
- a) To sterilize the medium
 - b) To recover the product
 - c) To provide optimum growth conditions to organisms and obtain the desired product
 - d) To purify the product
26. While constructing the fermenter, which of the following is not required?
- a) High-speed Agitation and Aeration system
 - b) Temperature control system
 - c) pH control system
 - d) Sample facilities
27. Which of the following material is preferable for the construction of small-scale fermenter?
- a) Quartz
 - b) Glass
 - c) Iron steel
 - d) Wood
28. The largest diameter for glass fermenter is _____
- a) 50 cm
 - b) 70 cm
 - c) 60 cm
 - d) 80 cm
29. The purpose of aeration is to provide _____
- a) The medium to organisms
 - b) The carbon dioxide to organisms

- c) The oxygen to organisms
 - d) The water to organisms
30. The Aeration is mainly provided to organisms present in _____
- a) Submerged culture
 - b) Solid State culture
 - c) Surface culture
 - d) Batch culture
31. The agitator is required to _____
- a) Provide air
 - b) Mixing objectives
 - c) Purify the product
 - d) Sterilize the media
32. Which of the following agitator consists of vanes in a vertical plane around the circumference?
- a) vaned discs
 - b) disc turbines
 - c) variable pitch turbines
 - d) marine propeller
33. Which of the following agitator consists of blades directly attached to a boss on agitator shaft?
- a) vaned discs
 - b) disc turbines
 - c) rectangular turbines
 - d) marine propeller

Unit III

1. On which individuals study of newly invented medicines are not done?
- a) Pregnant and elderly
 - b) Fasting person
 - c) Healthy person
 - d) Adult male
2. For a zero order reaction, the rate of reaction is independent of _____
- a) Temperature
 - b) Nature of reactants
 - c) Concentration of reactants
 - d) Effect of catalyst

3. The half-life period of zero order reaction is directly proportional to the _____
- Rate constant
 - Initial concentration of reactants
 - Final concentration of reactants
 - Concentration of products
4. For a first order reaction, the half life period is independent of the _____
- Initial concentration of the reactants
 - Final concentration of the reactants
 - Rate constant
 - Concentration of products
5. In a first order reaction, the time required for the completion of 99% is _____ for its 90% completion.
- Same
 - Negligible
 - Thrice
 - Twice
6. The half life period of first order reaction is 15 min. Its rate constant will be equal to _____
- 0.0462 min^{-1}
 - 0.462 min^{-1}
 - 0.00462 min^{-1}
 - 0.562 min^{-1}
7. Which of the following is not an example of second order reaction?
- Oxidation of hydrogen bromide
 - Saponification of ester
 - Acid catalyzed hydrolysis of ester
 - Gaseous decomposition of hydrogen iodide
8. The order of the reaction, if the time of half-completion is changed from 50 sec to 25 sec, when the initial concentration is changed from 0.5 to 1M will be _____
- 0
 - 1
 - 2
 - 3
9. Which statement about the process of drug discovery is true?
- It only encompasses the non-clinical laboratory and animal testing.
 - It is the process which ascertains the effectiveness and safety of potential drug candidates.
 - It is the process by which therapeutic compounds are formulated

- medicines.
- d) It ensures there are no side-effects associated with the potential drug candidates.
10. Comparison of the rate and extent of the absorption of drug from the formulation under study to the data of a reference standard that is given intravenously, is known as _____.
- Bioavailability
 - Absolute bioavailability
 - Relative bioavailability
 - Biopharmaceutics
11. The usual range of bioavailability is from _____
1. 0 to 1
 2. 0 to 10
 3. 1 to 10
 4. 1 to 20
12. If the Relative Bioavailability is 1, it indicates
- Complete bioavailability of the drug
 - Bioavailability of dosage form of one drug is same as that of the other dosage form
 - Complete binding of the drugs to the proteins as compared to the standard drug
 - Complete distribution of the drug
13. What would be the order of greater or lesser bioavailability of the dosage forms?
- Oral > intravenous > rectal > topical
 - Intravenous > rectal > oral > topical
 - Intravenous > topical > rectal > oral
 - Intravenous > oral > rectal > topical
14. Diffusion Assay carried out _____
- On solid media
 - In liquid media
 - In test tubes
 - In conical flasks
15. Paper-disc method is example of _____
- Enzymatic assay
 - End-point determination assay
 - Turbidimetric assay
 - Diffusion assay
16. Growth measured as optical density in _____
- Turbidimetric assay
 - Diffusion assay
 - Metabolic response assay

- d) Enzymatic assay
17. Biological assays are _____
- a) Qualitative
 - b) Quantitative
 - c) Can be qualitative and Quantitative
 - d) Can't be qualitative and Quantitative
18. What is bioequivalence?
- a) Comparison between 3-year-old drugs to the same new drug
 - b) Comparison between a drugs to another drug
 - c) Comparison between a drug's specific characteristics to a defined set of standards
 - d) Comparison between two or 3 characteristics of a drug to the same characteristics of a different drug
19. What is bioavailability?
- a) The time of absorption of the drug from its dosage form
 - b) The rate of absorption of the unchanged drug from its dosage form
 - c) The time of absorption of the unchanged drug from its dosage form
 - d) The rate of absorption of the drug from its dosage form
20. Which of the following is the pharmacodynamics method of studying bioavailability?
- a) Acute pharmacologic response
 - b) Plasma-level time studies
 - c) Urinary excretion studies
 - d) Stool excretion studies
21. What is the equation of bioavailable fraction?
- a) $1/\text{Bioavailable dose}$
 - b) $1/\text{Administered dose}$
 - c) $\text{Bioavailable dose}/\text{Administered dose}$
 - d) $\text{Administered dose}/\text{Bioavailable dose}$
22. Which of the following is the most accurate method for microbial assay of antibiotics?
- a) Physical assay
 - b) Chemical assay
 - c) Biological assay
 - d) Chemical and biological assay
23. _____ provide more errors.
- a) Biological assays
 - b) Chemical assays
 - c) Physical assays
 - d) Antibiotic assays

24. Test organisms used for Bioassay should _____.
- Be bacteria
 - Not be a pathogen
 - Grow at all pH
 - Be a virus
25. _____ is an example of bioassay.
- Acid Base Titration Assay
 - Metabolic Response Assay
 - Chromatography Assay
 - Antibiotic assay
26. Growth measured as optical density in _____
- Turbidimetric assay
 - Diffusion assay
 - Metabolic response assay
 - Chemical assay
27. Zone of exhibition means area where _____
- Organisms grows
 - Antibiotics diffuse
 - Organisms killed by diffused antibiotics
 - Antibiotics does not diffuse
28. U.V Spectrophotometric analysis is useful for substance containing _____
- Cyclic ring structure
 - Aromatic ring with double bond
 - Aliphatic compound with double bond
 - Alkane structure
29. Which assay technique is more appropriate for the detection of product _____
- Physical and chemical assay
 - Biological assay
 - Chromatographic assay
 - Combination of more than one assay technique
30. _____ technique is more useful for the separation of hydrophobic compounds
- TLC
 - Gas Chromatography
 - paper Chromatography
 - HPLC
31. _____ is not method for the assaying of product.

- a) Chromatography
- b) Centrifugation
- c) Spectrophotometry
- d) Colorimetric Analysis

32. Gas Chromatography can be used for _____

- a) Heat stable compounds
- b) Heat sensitive compounds
- c) Gases only
- d) All Solid compounds

33. Gravimetric analysis is suitable for the assay of the compounds that are _____

- a) Acidic
- b) Basic
- c) Insoluble
- d) Soluble