



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – M.Sc.(MLT)-2023

Course Name – Industrial and Pharmaceutical Microbiology

Course Code - MMTC04002

(Semester IV)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Identify the batch culture or fermentation can be used to produce
 - a) Single Cell Protein
 - b) Antibiotics
 - c) Organic acids
 - d) Amino acids
- (ii) Select which of the following allows researchers to optimize metabolic pathways in microorganisms for efficient production of desired compounds in industrial microbiology
 - a) Bioremediation
 - b) Systems Biology
 - c) Genetic Engineering
 - d) Fermentation
- (iii) Predict which of the following is continually refined in modern industrial microbiology to enhance productivity, reduce costs, and increase the range of products synthesized by microorganisms.
 - a) Antibiotic production
 - b) Genetic engineering
 - c) Metabolic pathways
 - d) Bioprocessing technologies
- (iv) In which of the following the microorganisms grow on the surface of the medium?
 - a) Submerged fermentation
 - b) Surface fermentation
 - c) Solid state fermentation
 - d) Batch fermentation
- (v) Infer what happens to cell after treatment with sodium dodecyl sulphate
 - a) Enzymatic cell disruption
 - b) Plasmolysis
 - c) Non mechanical cell disruption
 - d) Deplasmolysis
- (vi) Select which of the following antimicrobial agent does not act on 50s ribosomal subunit.
 - a) Aminoglycosides
 - b) Macrolides
 - c) Streptogramin
 - d) Chloramphenicol
- (vii) Identify the proper reason- the head space of an aerobic fermenter is left void
 - a) Splashing, foaming and aeration
 - b) Insertion of probes
 - c) Quality Control and Assessment
 - d) Changes in pH

(viii) Identify the correct option- downstream processing step involving the removal of water to increase the concentration of the desired product by-

- a) Filtration
- b) Sterilization
- c) Drying
- d) Centrifugation

(ix) Choose the material commonly used in the entrapment of enzymes.

- a) Silica
- b) Calcium
- c) Alginate
- d) Amberlite

(x) Select the correct name of the culture used in chemostat and turbidostat are the types of bioreactors

- a) Batch culture
- b) Continuous culture
- c) Fed-Batch culture
- d) Solid State culture

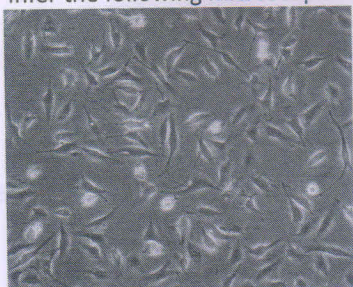
(xi) Identify the chemical agent used for fumigation of OT.

- a) Halogen
- b) Formaldehyde
- c) Alcohol
- d) UV ray

(xii) Select the mechanism of inhibiting action of penicillin

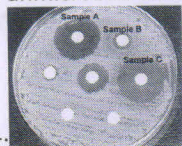
- a) Inhibiting protein synthesis
- b) Disrupting cell wall synthesis
- c) Blocking DNA replication
- d) Inhibiting folic acid synthesis

(xiii) Infer the following microscopic Characteristics is responsible for:



- a) Endothelial Cells
- b) Fibroblast Cells
- c) Epithelial Cells
- d) Tumor neoplasms

(xiv) Evaluate the antimicrobial efficacy of samples from antimicrobial plate in the correct



order format:

- a) $A < B < C$
- b) $A > B > C$
- c) $A > C > B$
- d) $A > B < C$

(xv) Doxorubicine pharmacokinetics of liposomal formulations of chemotherapeutic drugs because

- a) its enhanced drug accumulation in tumors due to the enhanced permeability and retention (EPR) effect
- b) Decreased drug half-life in circulation
- c) Reduced stability in the bloodstream due to increased enzymatic degradation
- d) Higher risk of systemic toxicity due to faster drug release

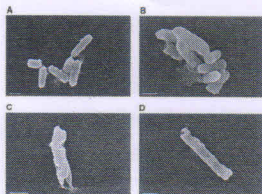
Group-B

(Short Answer Type Questions)

3 x 5=15

2. Define Split number, Passage number and generation time
3. Define Primary Explant Technique in cell culture technique
4. Classify anticancer drugs with proper examples.
5. Interpret the image with characteristic features.

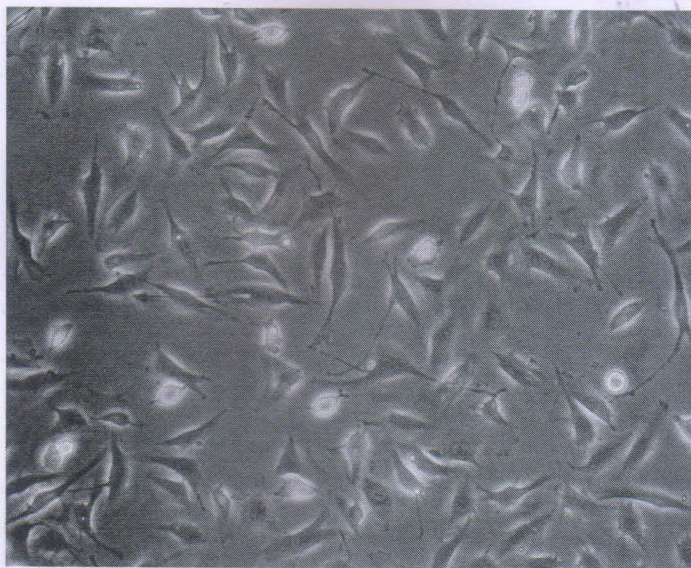
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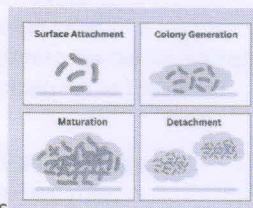
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6. Infer the microscopic image and its characteristics

(3)



OR



(3)

Interpret the following image and identify the process

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Dr. Das wants to prevent bacterial aminoacylation during protein synthesis and Dr. De wants to inhibit the formation of 30S initiation complex. Analyze and explain the name and mode of action of antibiotics for their experiment. (5)
8. Explain the significance of Trypsinizaion in Cell culture method. (5)
9. Justify the importance of maintaining a sterile environment during the process of passaging cells in culture. (5)
10. Evaluate the mechanisms through which bacteria develop antibiotic resistance? (5)
11. Criticize the role of microbiome which play in the development and spread of antibiotic resistance? (5)
12. Analyze the role of membrane disruption in the action of polymyxins. How does the interaction with the bacterial cell membrane contribute to the antibiotic's bactericidal effect, and what are the challenges in using polymyxins? (5)

OR

Design a study to explore the efficacy of combination therapy involving beta-lactams and macrolides. (5)

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