



BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – M.Sc.(BT)-2022/M.Sc.(BT)-2023
Course Name – Microbial Biology
Course Code - MBTC102
(Semester I)

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) Report which of the following is not the characteristic of a growth curve?
- | | |
|---|---|
| a) shows development of microbial population under relatively stable environmental conditions | b) shows development of microbial population under relatively stable environmental conditions |
| c) Graphs numbers of microbes versus time | d) Each growth curve consists of four distinct phases |
- (ii) Peptidoglycan is also known as.....where was Chitin is known as
- | | |
|---|---|
| a) N-acetyl muramic acid and murein mucopeptide | b) murein mucopeptide and N acetylglucosamine |
| c) N acetylglucosamine and murein mucopeptide | d) mesodiaminopimetic acid and Glucosamine |
- (iii) Which of the following organisms typically get their carbon for biosynthesis from carbon dioxide?
- | | |
|---|---|
| a) Glucose-fermenting bacteria (fermentation) | b) Anaerobic, glucose-respiring bacteria (anaerobic respiration){ |
| c) Aerobic, glucose-respiring bacteria (aerobic respiration){ | d) Ammonia-oxidizing bacteria (chemolithotrophic bacteria){ |
- (iv) In Griffith Experiment of " Transforming principal"
- | | |
|---|--|
| a) S train bacteria gets protected from phagocytosis because they contain capsule and slime layer | b) R train bacteria gets protected from phagocytosis as they contain capsule and slime layer |
| c) S train bacteria gets engulfed by phagocytosis because they contain capsule and slime layer | d) R train bacteria gets engulfed by phagocytosis because they contain capsule and slime layer |
- (v) SARS-CoV-2 virus capsomere is made up ofwhere as spike protein is made up of
- | | |
|---------------------------------|----------------------------|
| a) Glycoprotein and Polypeptide | b) protein and Polypeptide |
|---------------------------------|----------------------------|

- c) Protein and Glycoprotein
 d) Proteoglycan and Glycoprotein
- (vi) Select from the following that refers to photosynthesis performed by bacteria with the use of water as the donor of electrons
- a) oxygenic
 b) anoxygenic
 c) heterotrophic
 d) phototrophic
- (vii) Choose the phase that shows the reproduction rate equal to the equivalent death rate
- a) Log phase
 b) Stationary phase
 c) Death phase
 d) Lag phase
- (viii) Choose the one where the respiratory chain of bacteria is associated with _____
- a) mitochondrial membrane
 b) cytoplasmic membrane
 c) cell wall
 d) cytoplasm
- (ix) Recall, type strain is used for referring to
- a) species
 b) genus
 c) family
 d) division
- (x) State the correct order of taxonomic groups from higher to lower rank
- a) Kingdom—Order—Class—Family
 b) Order—Class—Division—Family—Genus—Species
 c) Kingdom—Order—Division—Family—Class—Genus—Species
 d) Kingdom—Division—Class—Order—Family—Genus—Species
- (xi) Peptone water and nutrient broth are ----- type of media
- a) Basal media
 b) Specialized media
 c) Differential media
 d) Enriched media
- (xii) Show the property where two organisms that are very closely related to each other have__
- a) similar mol% G+C values
 b) different mol% G+C values
 c) similar mol% G+C values and heteroduplexes are formed
 d) different mol% G+C values and heteroduplexes are not formed
- (xiii) Select the portion of the growth curve where rapid growth of bacteria is observed
- _____
- a) Lag phase
 b) Logarithmic phase
 c) Stationary phase
 d) Decline phase
- (xiv) Choose what Lag phase is known as _____
- a) period of initial adjustment
 b) transitional period
 c) generation time
 d) period of rapid growth
- (xv) Recall among the following that comes under Gram-positive eubacteria
- a) Clostridium
 b) Actinomyces
 c) Rhizobium
 d) Clostridium, Actinomyces

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Why does peptidoglycan contain the unusual D isomers of alanine and glutamic acid rather than the L isomers observed in proteins? (3)
 3. Describe the primary function of differential media in microbiology, and give an example of a differential medium. (3)
 4. Evaluate how does the preservation of various types of foods contribute to their extended shelf life? (3)
 5. Apply three chemicals that acts as bactericidal agent. (3)
 6. Explain the importance of cotton plugs on culture vessels. (3)
- OR
- Justify why might life in a biofilm be advantageous for microbes? (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. Illustrate diauxic growth curve of *Escherichia coli* on a mixture of glucose and lactose. (5)
8. Illustrate the principles of IMVIC Test and its uses. (5)
9. **Illustrate and explain the concept of bacterial transduction and the two different types of transduction.** (5)

10. Illustrate the four phases of the growth curve of bacteria in a batch culture and discuss the causes of each. (5)

11. Explain the mechanism and symptoms of Staphylococcal Food Poisoning. (5)
12. Estimate temperature ranges for microbial growth. (5)

OR

Differences between endotoxin and exotoxin discharged by bacteria. (5)
