Total number of printed pages:4 **UG/3rd/UFET304**

2021

BASIC MICROBIOLOGY

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **question A and any four** questions from **B***

A. ATTEMPT **ALL** OF THE FOLLOWING 1 × 20

1. Who among the following is one of the pioneers of 'germ theory' that help advance microbiology? 1

(a) Louis Pasteur (b) Nicolas Appert
(c) Kary B. Mullis (d) Ferdinand Cohn

2. Which of the following are the three domains of living organisms? 1

(a) Eubacteria, archaea, eukarya (b) Bacteria, plants, animals
(c) Animals, plants, archaea (d) Archaea, bacteria, fungi

3. Which one of the following is an intracellular structure in a bacterial cell? 1

(a) Cell wall (b) Plasma membrane
(c) Mitochondria (d) Flagella

4. Translation occur in – 1

(a) plasma membrane. (b) cytoplasm. (c) nucleoid.
(d) ribosome.

5. Hopanoid in plasma membrane performs which one of the functions?1

(a) Resistance against antimicrobials (b) Maintaining fluidity of plasma membrane
(c) Transportation to and from the cell (d) None of these

6. Which one of the following bacterial cell structures helps them with their locomotion? 1

(a) Pili (b) Tentacles (c) Pseudopodia (d) None of these

7. Which one of the following is a major structural component in plasma membrane? 1

(a) Lipid A (b) Peptidoglycan (c) O-antigen
(d) Phospholipid

8. Which one of the following type of microscope produce three-dimensional images? 1

(a) Phase-contrast (b) Dark-field (c) Transmission electron (d) Scanning electron

9. Which one of the following is a plasmid-mediated gene expression in bacteria? 1

(a) Virulence (b) Nutrient uptake (c) Multiplication
(d) None of these

10. Bacterial endospore formation takes approximately how much time to complete? 1

(a) 2 – 4 h (b) 6 – 8 h (c) 10 – 12 h (iv) 14 – 16 h

11. Which one of the following bacteria is a significant contributor to the nitrogen cycle? 1

(a) Pseudomonas (b) Rhizobium (c) Lactobacillus
(d) Sulfolobus

12. Which one of the following bacteria is rod-shaped? 1

(a) Bacillus cereus (b) Streptococcus thermophilus
(c) Lactococcus lactis (d) All of these

13. Transcription involves which one of the following? 1
(a) Mitochondria (b) Ribosome (c) m-RNA
(d) Plasmid

14. Gram staining shows difference of which one of following cell structures? 1
(a) Plasma membrane (b) Cell wall (c) Outer membrane
(d) Nulcleus

15. Which one of the following sugars is part of the bacterial cell genome? 1
(a) Glucose (b) Fructose (c) Sucrose
(d) Ribose

16. Which one of the following is a significant contributor to the carbon cycle? 1
(a) Cyanobacteria (b) *Sulfolobus* (c) *Rhizobium*
(d) *Azotobacter*

17. Which one of the following antibiotics disturbs protein synthesis in ribosome? 1
(a) Penicillin (b) Fluoroquinolone (c) Streptomycin
(d) Rifamycin

18. Which one of the following is a micronutrient needed by microorganisms? 1
(a) Calcium (b) Magnesium (c) Iron
(d) Zinc

19. Which one of the following microorganisms causes malaria? 1
(a) Vibrio cholerae (b) Mycobacterium tuberculosis
(c) Plasmodium (d) None of these

20. Which one of the following functional groups is part of the bacterial cell genome? 1

(a) Lactate (b) Phosphate (c) Citrate
(d) Carbonate

B. ANSWER **ANY FOUR** OF THE FOLLOWING. 2 × 6

21. List the Koch's postulates. Describe the modes of action of penicillin and tetracycline as antibiotics. Describe the four bacterial growth phases using an appropriately labeled graph. 4+(4+4)+8

22. How did Louis Pasteur proved 'germ theory' using goose-neck / swan-neck experiment – Explain with appropriate diagram? Elaborate on carbon-cycle and contribution of microorganisms in the cycle. What are tape warms / cestodes? 8+10+2

23. How are microorganisms classified according to their ability to survive and/or grow in presence / absence of oxygen? Give an example for each of the classifications. Describe heat sterilization operation carried out in a simple batch retort using an appropriately labeled diagram. What is the significance of Anthony van Leeuwenhoek's contribution in advancing the science of microbiology? 8+10+2

24. Elaborate on a primary and a secondary transport mechanisms carried out by a bacterial cell – Use relevant schematic diagrams to enrich your elaboration. Write short note on – (i) theory of spontaneous generation, (ii) importance of polymerase chain reaction (PCR) in microbiology.(8+8)+ (2+2)

25. Describe the difference in cell-wall structures between Gram positive and Gram negative bacteria using simple, appropriately labeled schematic diagrams. How does translation take place in ribosome – Explain with an appropriately labeled schematic diagram? What is a selective media – Explain with an example? 10+8+2