



WEST BENGAL STATE UNIVERSITY

B.Sc. Major 1st Semester Examination, 2023-24

MCBDSC101T-MICROBIOLOGY (MAJOR)

Time Allotted: 2 Hours

Full Marks: 50

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

Answer Question Number 1 and any four questions from the rest

1. Answer any *five* questions: 2×5 = 10
 - (a) Mention the limitations of Koch's postulates.
 - (b) Mention the importance of 16S rRNA homology study in bacterial Taxonomy.
 - (c) State two diseases caused by prions.
 - (d) What is parasexuality observed in fungi?
 - (e) What are aflatoxins? Name one producer organism.
 - (f) Name the source of agar agar. What is agar used for?
 - (g) State the contribution of S. Winogradsky.
 - (h) What do you mean by theory of spontaneous generation? Who finally disprove it?
2. (a) Mention the contribution of Robert Koch and M. Beijerinck in Microbiology. (2+2)+2+2+2
 - (b) What is germ theory of disease?
 - (c) Who discovered penicillin and streptomycin?
 - (d) What do you mean by Winogradsky column?
3. (a) What is the basis of taxonomic classification? 2+2+2+2+2
 - (b) Mention the similarities between archaeobacteria and eubacteria.
 - (c) Name the type of phospholipids present in the cytoplasmic membrane of the archaeobacteria.
 - (d) State the differences between viruses and viroids.
 - (e) Define the term species and strain of bacteria.
4. (a) List various pigments and reserve food that are found in different groups of algae. (2+2)+2+4
 - (b) What is tinsel and whiplash flagella?
 - (c) Describe diplobiontic life cycle of algae with proper diagram.

5. (a) What is prion? Name two diseases caused by it. (2+2)+2+4
(b) Why viruses are not affected by antibiotics?
(c) Mention the economic importance of algae.
6. (a) What are the salient features of Three domain classification? 3+3+4
(b) What were the criteria for Whittaker's five kingdom classification?
(c) Discuss about the merits and demerits of five kingdom classification.
7. (a) Mention the locomotor organelle of *Amoeba*, *Paramoecium* and *Giardia*. 3+4+3
(b) Briefly discuss the reproduction of protozoa with proper example.
(c) Differentiate the cellular structure between *Amoeba* and *Paramoecium*.
8. (a) What is mycotoxin? 2+2+2+2+2
(b) Mention the function of contractile vacuole in protozoa.
(c) Mention the causative agent of Malignant malaria and Kala-azar.
(d) Differentiate between amastigote and promastigote of *Leishmania*.
(e) What is pyrenoid granule?
9. (a) Name and describe different spores formed in asexual reproduction of fungi. 3+2+3+2
(b) What are the two different forms of *Leishmania*? What is leptomonad form?
(c) State the importance of pseudopodia and food vacuole in *Amoeba proteus*.
(d) Mention the mode of transmission of *Giardia* sp.



WEST BENGAL STATE UNIVERSITY

B.Sc. Major 1st Semester Examination, 2025-26

MCBDSC101T/MCBDSCN101T-MICROBIOLOGY (MAJOR)

Time Allotted: 2 Hours

Full Marks: 50/40

(i) Students of Session 2023-24 & 2024-25: 50 Marks

(ii) Students Session 2025-2026 Onwards: 40 Marks

The figures in the margin indicate full marks.

Candidates should answer in their own words and adhere to the word limit as practicable.

All symbols are of usual significance.

**Group-A and Group-B common for all students;
Group-C is only for the Students of Session 2023-24 & 2024-25**

GROUP-A

1. Answer any *five* questions from the following:

2×5 = 10

- (a) Mention the contribution of Louis Pasteur in the world of Microbiology.
- (b) What is numerical aperture of a microscope?
- (c) Why does oil immersion increase resolution?
- (d) What is the advantage of high surface area-to-volume ratio in bacteria?
- (e) What is pleomorphism? Give example of a pleomorphic bacterium.
- (f) What is spontaneous generation theory?
- (g) State the importance of rRNA in microorganisms from evolutionary viewpoint.
- (h) What are mesosomes?

GROUP-B

Answer any *three* questions from the following

10×3 = 30

2. What are Koch's postulates? Describe Koch's postulates in detail. State some limitations of the postulate.

2+5+3

3. (a) In what type of microscopy staining is not required? Describe the principle of this microscopy with suitable diagram.

1+(4+2)+3

(b) Differentiate between SEM and TEM.

4. (a) Why is molecular taxonomy advantageous than classical taxonomy? Discuss with examples.

4+4+2

(b) List the characteristics based on which Whittaker classified the living world into five kingdoms.

(c) Why is the 16S rRNA gene sequence so important?

5. (a) Name two dyes used in Endospore staining in Dorner's method. 2+4+2+2
 (b) How bacteria can be classified according to their flagellar arrangements? Give examples.
 (c) How penicillin is resisted by certain bacteria?
 (d) State the role of mordant in Gram-staining.
6. (a) What is Binomial nomenclature? Who is the pioneer of such nomenclature? (2+1)+2+5
 (b) State the importance of Binomial nomenclature in biological science.
 (c) State the differences between three kingdom and five kingdom classification.
7. (a) Differentiate among sphaeroplast, protoplast and L-form bacteria. 3+2+2+3
 (b) Schematically show the different components of bacterial LPS layer.
 (c) Why generally the surface of a Bacterium is negatively charged?
 (d) How the cross-linking is done in bacterial peptidoglycan?

ADDITIONAL FOR SUPPLEMENTARY CANDIDATES ONLY
For Students of Session 2023-24 & 2024-25 only (10 marks)

GROUP-C

Answer any *one* question from the following

8. (a) How is the cell wall of eubacteria different from that of archaebacteria? 10×1 = 10
 (b) How can you obtain spheroplast in Gram-negative bacteria? 2+2+(1+1)
 (c) What is 'Porin'? What is its function in Bacteria? +(1+3)
 (d) What is extrachromosomal inheritance in bacteria? Classify it with example.
9. Write short notes on: 2½ × 4 = 10
 (a) Negative staining
 (b) Resolving power of a microscope
 (c) Germ theory of disease
 (d) Acid-fast bacteria.

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