

RAMAKRISHNA MISSION VIDYAMANDIRA
(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, MAY 2025
FIRST YEAR [BATCH 2024-28]

Date : 24/05/2025

MICROBIOLOGY

Time : 11 am – 1 pm

Paper : 2MCBCOC1

Full Marks : 50

1. Answer **any ten** questions : [2×10]
- a) State the principle of negative staining.
 - b) Why does oil immersion objective generate a sharper image than dry objective in bright field microscopy?
 - c) State the importance of lag phase in bacterial growth curve.
 - d) What do you mean by metachromatic granules?
 - e) State one application of fluorescence microscopy and phase contrast microscopy
 - f) Define a pure culture.
 - g) What do you mean by pasteurization?
 - h) Explain how the environment of a colony differs from that of a liquid broth.
 - i) Write down the function of safranin in Gram's staining of bacteria.
 - j) How is an iodophore different from a tincture of iodine?
 - k) Name one teichoic acid containing bacterium.
 - l) Write down the mode of action of penicillin.
 - m) Write down the linkage in glycan part of peptidoglycan.
 - n) Write down two important features of alphaproteobacteria.
 - o) How does binary fission differ from budding?

Answer **any three** questions: [3×10]

2. a) Bacteria tend to stain more readily with cationic dyes – Justify the statement.
 - b) Why stationary phase come after log phase?
 - c) Starting with 100 bacterial cells/ml in a rich nutrient medium with 1hr lag phase and 20 mins generation time. How many cells will there be after 2hrs?
 - d) What is an electron microscope? Why does electron microscope have so much greater resolution than light microscope? [2+2+3+(1+2)]
3. a) Draw the ray diagram of 'Dark Field Microscope' with proper labeling.
- b) Define Resolving Power of a microscope. How it depends on the wavelength of light, refractive index and numerical aperture?
 - c) What is the function of decolorizing agent in Gram staining?
 - d) Why heat fixation is necessary for viewing organisms during staining? [2.5+(1+2.5)+2+2]

4. Differentiate :

[2.5×4]

- a) Complex media and Synthetic media
- b) Bright field microscope and Dark field microscope
- c) Capsule and slime layer
- d) Gram positive and gram negative bacteria

5. a) How do prokaryotic and eukaryotic ribosomes differ?

- b) rRNA may function as ribozyme- explain.
- c) Some bacteria may be source of biodegradable plastics- explain.
- d) What do you mean by moist heat sterilization? Name one disinfectant.

[2+2+3+(2+1)]

6. a) Archaea and Eukarya share a closer evolutionary history- justify.

- b) Di-glycerol tetraethers are important component of archaeobacterial cell membrane- analyze.
- c) With a neat diagram, describe the structure of outer membrane in eubacteria. Give an example of outer membrane-containing bacterium.

[3+3+(3+1)]

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