Clinical Microbiology Challenge:

Scenario-Based MCQs for MBBS Phase II Students

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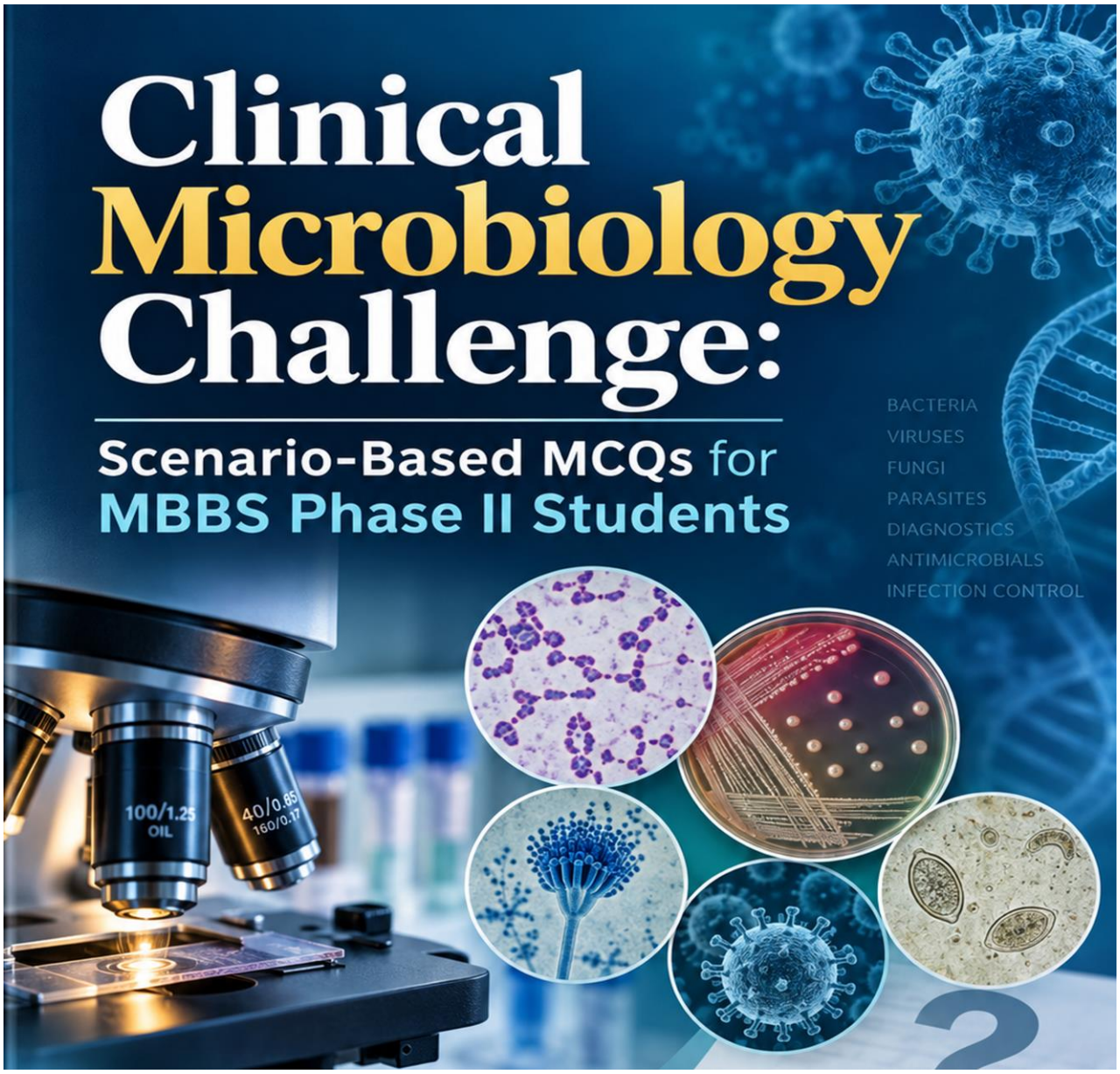






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ISBN : **978-81-69623-11-7**

Page(s) : **175**

Published Year : **2026**

Published by : **Excellent Publishers**
No. 38/48, Second street, Ellappa Nagar
Kanchipuram – 631501, Tamilnadu, India.
Cell +91-9842641794
excellentpublishers2013@gmail.com
www.excellentpublishers.com

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PREFACE

Dear Reader,

Clinical microbiology plays a vital role in the diagnosis, treatment, and prevention of infectious diseases. Clinical Microbiology Challenge: Scenario-Based MCQs for MBBS Phase II Students is designed to help students apply microbiological concepts to clinically relevant situations.

The scenario-based MCQs aim to develop clinical reasoning, problem-solving, interpretation of laboratory findings, and decision-making skills, while reinforcing core microbiology concepts. The book can serve as a useful resource for classroom learning, self-assessment, formative assessment, and examination preparation.

We hope this book makes learning microbiology more engaging, practical, and clinically relevant for MBBS students.

Sincerely,

Dr. Sayan Bhattacharyya,
Dr. Debalina Das,
Dr. Rehena Sarkar,
Dr. Piyali Datta

About Author(s)

Dr. Sayan Bhattacharyya



Dr. Sayan Bhattacharyya, MBBS, MD (Microbiology) is a distinguished Professor in the Department of Microbiology at the All India Institute of Hygiene and Public Health, Kolkata. He obtained his MBBS degree from Medical College, Calcutta, and subsequently completed his M.D. in Microbiology from the prestigious Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh. With an extensive academic, teaching, and research career, Dr. Bhattacharyya has made significant contributions to the field of microbiology and has authored 125 scientific publications in reputed national and international journals. He has received four awards in recognition of his academic and research contributions. His major areas of expertise include antimicrobial resistance (AMR), medical mycology, and food microbiology**,** with particular interest in microbial diagnostics and infection control. He is also the Chief Editor of EJMS, contributing to the advancement of scholarly communication and scientific publishing. Dr. Bhattacharyya has authored one book, edited two books, and contributed six book chapters. A dedicated educator, researcher, and academic mentor, he continues to make valuable contributions to microbiological research while guiding and inspiring young scientists and researchers in the field.

Dr. Debalina Das



Dr. Debalina Das, MD (Microbiology), DNB (Microbiology), MNAMS, FGID&AMS, and CICP (Silver Medal), is an Assoicate Professor in the Department of Microbiology at the College of Medicine and Sagore Dutta Hospital. She is a medical microbiologist with expertise in clinical and diagnostic microbiology, infectious diseases, and antimicrobial resistance. Her professional interests include infection prevention and control, antimicrobial stewardship, and medical education, with a particular focus on strengthening diagnostic practices and promoting evidence-based approaches to infectious disease management. She has authored 17 scientific publications and one book, reflecting her contributions to academic scholarship and scientific communication. She was awarded the Silver Medal in the CICP examination by the Consortium of Accredited Healthcare Organizations (CAHO), recognizing her achievement in the field. Through her academic, clinical, and research activities, she remains committed to advancing microbiological diagnostics, improving infection control practices, promoting the rational use of antimicrobials, and enhancing the quality of medical education and patient care.

Dr. Rehena Sarkar



Dr. Rehena Sarkar, MD (Microbiology), is an Assistant Professor in the Department of Microbiology at the Institute of Postgraduate Medical Education and Research (IPGMER). Her academic interests include medical education and curriculum development. She has contributed to the field through eight published research articles and remains actively engaged in academic and educational initiatives in medical microbiology.

Dr. Piyali Datta



Dr. Piyali Datta, MBBS, MD (Microbiology), is an Assistant Professor in the Department of Microbiology at Malda Medical College and Hospital. Her areas of professional and academic interest include infection control, antimicrobial stewardship, diagnostic stewardship, and medical education**.** She has contributed to scientific research and has published seven research articles in academic journals. Her work reflects a strong commitment to improving clinical microbiology practices, patient safety, and quality healthcare through evidence-based approaches.

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Chapter 1

Bloodstream and Cardiovascular System Infection

By Dr. Piyali Datta, Assistant Professor, Microbiology, Malda Medical College and Hospital

1. A 65 year old ICU patient is suspected to be suffering from Catheter related blood stream infection (CRBSI). From this patient simultaneous blood culture was obtained from Central line (CL) and peripheral line (PL). Which of the following criteria is applicable to diagnose CRBSI?

A. CL blood culture bottle flags > 2hrs earlier to PL blood culture
B. PL blood culture bottle flags > 2hrs earlier to CL blood culture
C. CL blood culture bottle flags <1 hr earlier to PL blood culture
D. PL blood culture bottle flags <1 hr earlier to CL blood culture

Answer. A. CL blood culture bottle flags > 2 hrs earlier to PL blood culture

Explanation: For the diagnosis of CRBSI simultaneous blood culture from CL and PL is carried out and CL blood culture bottle flags ≥2 hrs earlier to PL blood culture (ie. differential time to positivity ≥2hrs).

(Reference: Sastry AS, Bhat S. Essentials of Medical Microbiology. 4th ed. New Delhi: Jaypee Brothers Medical Publisher; 2023)

2. A 45 year old patient admitted in ICU. A central line was inserted upon admission. After 4 days he developed catheter related blood stream infection (CRBSI). Which of the following is considered as risk factor for CRBSI?

A. Short duration of central line
B. Femoral vein selection for central line
C. Chlorhexidine use for skin antisepsis
D. Single lumen central line

Answer. B. Femoral vein selection for central line

Explanation: The common risk factors associated with pathogenesis of CRBSI are:

Device related- Longer duration CL (≥72 hours), Femoral vein CL, non-tunneled catheter, multi-lumen CL, emergency insertion of CL carry higher risk.

Patient- related- Immunodeficiency, loss of skin integrity, alteration of skin microflora

Caregiver related- Poor hand hygiene, lack of infection control practices, use of alcohol for skin asepsis

Chapter 9

Healthcare-Associated Infections (HAI) and Miscellaneous Infections

By Dr. Sayan Bhattacharyya, Professor, Department of Microbiology, AIIH&PH, Kolkata.
Email: - sayantheboss@yahoo.co.in

Q 1. Catheterized urine from a patient grows a non lactose fermenting bacterium, which is Oxidase negative, motile and has musty or acrid odour. What can the bacterium be?

a. *Stenotrophomonas* spp.
b. *Acinetobacter* spp.
c. *Pseudomonas aeruginosa.*
d. None of the above.

(Ans:-a. *Stenotrophomonas maltophilia* has musty odor. Reference:- www.microbiologyinpictures.com)

Q 2. A swab taken from hospital water bath grows a Gram negative bacterium, aerobically, with bright brick-red non-diffusible pigment. What can the bacterium be ?

a. *Serratia marcescens*
b. Prevotella spp.
c. *E. coli.*
d. None of the above.

(**Ans:-a.** Explanation:-*Serratia marcescens* is a member of order Enterobacterales and produces bright red non diffusible pigment. It is commonly found in hospital water. Reference:-Blodeanu L, et al. *Serratia marcescens*: A Versatile Opportunistic Pathogen with Emerging Clinical and Biotechnological Significance. Int J Mol Sci. 2025 Nov 27; 26(23): 11479. doi: 10.3390/ijms262311479)

3. Radha, a staff nurse, keeps a distance of 3.3 feet in between beds in the ward. Is it sufficient to prevent cross transmission of infections?

a. No.
b. Yes.
c. Maybe.
d. Cannot say.

(**Ans:-b.** Explanation:-A distance of 3.3 feet or 1 metre in between successive beds is enough to stop cross transmission of infections. Reference:- www.nhs.england.uk)

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Clinical Microbiology Challenge: Scenario-Based MCQs for MBBS Phase II Students is a comprehensive and well-structured guide designed to help medical undergraduates strengthen their understanding and clinical application of microbiology. The book presents a collection of scenario-based multiple-choice questions (MCQs) that mirror real-life clinical situations, enabling students to develop problem-solving skills, reinforce core concepts, and prepare effectively for examinations.



Key Features

- **Scenario-based** MCQs with detailed options
- Covers essential topics in clinical microbiology
- Focus on real-life clinical case scenarios
- Helps in concept clarity and quick revision
- Useful for MBBS Phase II students and examination preparation

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ISBN 978-81-69623-11-7