

Essentials of Microbiology

Second Edition

An Integrated Clinical Case Based Approach *Including Parasitology*

is the thoroughly revised, rewritten and updated edition of the book which has been written and designed in accordance with the latest CBME Guidelines. In a first level medical microbiology programme, a strict clinical system-wise study of the microbes would not only hinder the understanding and concept building of microbiology in the medical students but may imprint erroneous perceptions, as most microbes know no anatomical borders.

Competency Based Undergraduate Curriculum for the Indian Medical Graduate, prescribed by the National Medical Commission, advocates a horizontal and vertical integration of microbiology with other subjects on the basis of clinical systems. On this ground, microbiology has been a victim in the new CBME Guidelines. How does one approach this dilemma?

The book has introduced more than 100 integrated clinical cases, including 23 on parasitic diseases; referenced clinical system-wise in exclusive infectious diseases section and dealt in the relevant microbiology category. The book imbibes the spirit and word of the competency-based curriculum and yet retains the traditional approach to learning microbiology for greater understanding. It has bidirectional linkages, which permit navigation from clinical cases to core microbiology and otherwise. The book has been designed primarily for induction of the subject to the medical undergraduates, and not as a postgraduate entrance book, yet would also be helpful in the latter respect.

Salient Features and Highlights

- More than 55 bacterial and fungal, 25 viral and 23 parasitic based integrated clinical-based cases to make a sound foundation of the infectious diseases in medical students. Worked out in a systematic Q-A based format for clear understanding.
- More than 33 general microbiology | infection control and pandemic management and 15 immunology-based clinical vignettes | clinical cases worked out in a systematic fashion to make a sound foundation of medical microbiology.
- All chapters in clinical infectious diseases | syndromes of various systems are provided with clinical details including collection, transport and processing techniques. Also provided are exclusive clinical cases, including references of clinical cases.
- All sections on bacterial diseases have separate subsections for outline or classification of organisms, metabolic and microscopic features, media requirements and colonial characters (including diagnostic), clinical profile, laboratory diagnosis of important bacterial diseases and treatment. This is organized in an integrated tabular format.
- Sections dealing with DNA and RNA viral infections have exclusive tabulated and referenced chapters on clinical profile and laboratory diagnosis of such infections.
- Protozoology and helminthology sections in parasitic diseases have exclusive chapters on morphological profile, transmission | life-cycle and host's profile, clinical profile, laboratory diagnosis profile and treatment profile.
- All sections have assessment | examination questions including MCQs with answers and references.

The book also includes:

- An exclusive section on pandemic management
- Two AETCOM scenarios with reference to microbiology
- More than 50 quotations to inspire the reader
- Content format offers flexibility to sequence of learning and teaching
- Complimentary digital resources for young medical teachers
- Appendix on internet resources

Comments on the first edition of textbook based on clinical cases from a leading national medical journals

- "First ... microbiology book by an Indian author on clinical case format."
- "Blending of core microbiology and syndromes is appreciable."
- "Overall ... a good resource of CBME in microbiology for students and ... a good addition to the library."

From the readers

- "Interactive reading as a result of clinical vignettes/cases makes study relevant, interesting and easily recapitulatable"
- "Is alternative (relevant and exciting) route to medical microbiology learning"

VS Randhawa MD (Microbiology) is currently Director Professor, Department of Microbiology, Lady Hardinge Medical College, New Delhi. He has also taught at Dr RML PGIMS, New Delhi; JN Medical College, Aligarh; SGGIMS, Lucknow, and MAMC, New Delhi. He has been awarded the best thesis medal (1989), HIV/AIDS control plan (Osaka University) and twice WHO fellowships (2002 and 2011); conferred upon IMSA fellowship in 2009 and awarded 'Rashtriya Gaurav award' in 2016 and ACC course (2022). He is technical assessor with the NABL, New Delhi, and National Assessment and Accreditation Council (NAAC), Bengaluru; approved assessor with NMC and appraiser with NBE; master-trainer of ICTC medical personnel and evaluator for MD, DM and PhD courses; subject expert to various apex national bodies; and principal investigator in many national projects.

Prof Randhawa has written two textbooks and contributed chapters in three books. He is reviewer for many leading national and international journals. He has to his credit numerous high impact papers published in indexed and international journals, besides over 70 scientific presentations in national and international platforms.

CBS Publishers & Distributors Pvt Ltd
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ISBN: 978-93-5466-597-4



Randhawa

Including Parasitology

Essentials of Microbiology
An Integrated Clinical Case Based Approach

Second Edition

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An Integrated Clinical Case Based Approach

Including Parasitology

As per the latest CBME Guidelines |
Competency Based Undergraduate
Curriculum for the Indian Medical Graduate



VS Randhawa



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VS Randhawa MD, FIMSA

Director Professor, Department of Microbiology
Lady Hardinge Medical College, New Delhi
Formerly: Dr RML PGIMS, New Delhi
JN Medical College, Aligarh
SGPGIMS, Lucknow
MAMC and Associated Hospitals, New Delhi



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An Integrated and Clinical Case Based ApproachIncluding **Parasitology****ISBN:** 978-93-5466-597-4

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Second Edition: 2024**CBS Edition: 2022**

First Edition: 2020

Reprint: 2022, 2023

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Published by **Satish Kumar Jain** and produced by **Varun Jain** for**CBS Publishers and Distributors Pvt Ltd**

4819/XI Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India.

Ph: 011-23289259, 23266861

Website: www.cbspd.come-mail: delhi@cbspd.com;**Corporate Office:** 204 FIE, Industrial Area, Patparganj, Delhi 110 092, India

Ph: 011-4934 4934

Fax: 011-4934 4935

e-mail: publishing@cbspd.com;publicity@cbspd.com**Branches**

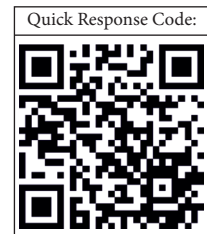
- **Bengaluru:** Seema House 2975, 17th Cross, K.R. Road, Banasankari 2nd Stage, Bengaluru 560 070, Karnataka, India
Ph: +91-80-26771678/79 Fax: +91-80-26771680 e-mail: bangalore@cbspd.com
- **Chennai:** 7, Subbaraya Street, Shenoy Nagar, Chennai 600 030, Tamil Nadu, India.
Ph: +91-44-26680620, 26681266 Fax: +91-44-42032115 e-mail: chennai@cbspd.com
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- **Kolkata:** 147, Hind Ceramics Compound, 1st Floor, Nilgunj Road, Belghoria, Kolkata-700 056, West Bengal, India
Ph: +91-33-25633055-56 e-mail: kolkata@cbspd.com
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Ph: +91-522-4000032 e-mail: tiwari.lucknow@cbspd.com
- **Mumbai:** PWD Shed, Gala No. 25/26, Ramchandra Bhatt Marg, Next to JJ Hospital Gate No. 2, Opp Union Bank of India, Noorbaug, Mumbai-400009, Maharashtra, India
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Printed in: Sanjay Printers & Publishers Pvt. Ltd, Patparganj Industrial Area, Delhi

to
my Guru
and
my late parents Jaswant Kaur and Prof HS Randhawa



Book Review

Essentials of microbiology: An Integrated and clinical Case Based Approach, 1st edition. VS Randhawa, (CBS Publishers & Distributors Pvt. Ltd., New Delhi, India) 2021. 888 pages. Price: Not mentioned.

ISBN: 978-93-5466-351-2

Training in the discipline of microbiology for MBBS students has remained a matter of discussion for a long time. Although the relevance of this subject for medical students was never undermined as infectious diseases continue to pose public health problem worldwide, the need for the existing curricula with a large volume of knowledge-based content is less acceptable. In medical education, problem-based or competency-based education is getting more acceptance with students and teachers. This is easily applied to the medicine- and surgery-related specialities; however, for microbiology, the challenge is great. What is being taught in conventional methods of teaching is not really applicable to the clinical practice or national health priorities. Integrated clinical-based studies of various infectious diseases or syndromes can make a student understand the need for the study of microbiology in medicine, which is the spirit underlying the competency based medical education (CBME).

Hence, with the curriculum modified to competency based, the challenge adapting to the modified methods of teaching and assessment. Assessment is a very important component, which drives learning. To achieve that, there is a need of a book to guide from this perspective. The existing textbooks were not able to address some of these aspects as these were written from a different perspective. In this scenario, a new

book written afresh with revised content to address the CBME is welcome. The book is exhaustive and broadly divided into XVII sections. The tool for the assessment of competency-based education is also addressed in this book.

Section I on the general microbiology has been put interestingly in context of clinical practice, highlighting its applied importance while retaining the basic information of microorganisms. Section II on immunology is simplified with diagnostic significance added. Section III on infectious diseases syndromes is totally a new addition for a microbiology textbook, especially oncogenic component. The other sections focused on basic knowledge—regarding virulence/ pathogenesis in bacteriology/virology/parasitology/mycology—have been addressed which retains the knowledge domain and integration with clinical cases is an added value. Chapters on infection control and pandemic outbreak management, healthcare-associated infections and SARS-CoV-2 are also updated. The important text has been highlighted, footnotes have been added where needed, text changes to capture attention, simplified figures and drawings are added for clarity of the understanding of the subject.

Overall this book is a good resource of CBME in microbiology for students and will be a good addition to the library.

Arti Kapil

Department of Microbiology, All India Institute of
Medical Sciences, New Delhi, India
akapilmicro@gmail.com

Preface to the Second Edition

The compilation of the first edition of the book was a very time consuming, challenging and risky venture, as it involved redefining; what a medical microbiology textbook should incorporate with reference to CBME guidelines. However, the overwhelming response to the book by the faculty and students was very satisfying, as many institutions adopted this as a textbook for the undergraduate students and the book received rave reviews.

The need to update the book has arisen within one year of the printing of the first edition; as teaching the subject according to the CBME guidelines posed many challenges, which had to be addressed, besides the feedback of many faculty and students. It is very fulfilling to present the thoroughly updated second edition of the textbook. Most features of the previous edition have been retained. Some of the changes that have been incorporated include taxonomic reclassification. For instance, Enterobacteriaceae have been reclassified as Enterobacterales. The frequent changes in the classification cause tremendous confusion at many levels, but these cannot be ignored. The newer generation of antimicrobials has also been incorporated. Newer molecular biology techniques as CRISPR have been covered. Newer diagnostic techniques as IgG avidity assay have been added. Epidemiologic strategies in blocking transmission of infection including AMR implementation have been included. Newer vaccines have been appended. Update on AETCOM has been done. Any feedback on the book would be highly appreciated.

VS Randhawa



Preface to the First Edition

The book is according to the latest competency based curriculum. The key role of medical microbiology undergraduate medical curriculum in the MBBS program has become indisputable after the Covid-19 pandemic. Medical Microbiology plays a key role in the diagnosis and management (including prevention) of infectious diseases. However, majority of the medical students fail to grasp that essence, while studying the subject. They struggle with the vast microbiological information available in the microbiology textbooks and are unable to see its relevance, besides finding difficulty in its recapitulation and integration with the medical curriculum. The current book is not a compilation of facts but comprises meaningful integrated clinical data. Such a style also encourages application of microbiological information.

The competency based curriculum has emphasized a clinical-oriented approach, to make the subject relevant to the national health priorities. This book is designed in this direction. In a first level medical microbiology programme, a strict clinical system wise study of the microbes would not only hinder the understanding and concept building of medical microbiology in the students but could imprint erroneous perceptions, as most microbes know no anatomical borders. Competency based medical education curriculum advocates a horizontal and vertical integration of Microbiology with other subjects based on clinical systems. On this ground, microbiology has been a victim in the new CBME. How does one tackle this dilemma? The book has introduced more than 100 integrated clinical cases (including 23 of parasitic diseases); referenced clinical system wise in exclusive Infectious Diseases section and dealt in the relevant microbiology category. So the book imbibes the spirit and word of the competency based curriculum and yet retain the traditional approach of microbe learning. It has bidirectional linkages, which permit navigation from clinical cases to core microbiology and otherwise. All the main chapters with clinical cases have been provided with linkages for providing comprehensive grasping of topics. Numerous bacterial agents have diverse microscopic, metabolic features, colony characteristics, media requirements, varying laboratory diagnosis profiles, treatment profiles and vaccines. To understand them and to recall them, there is no better way than to tabulate them on a mega scale covering entire topics. This approach has been followed comprehensively for these parameters.

To meet the CBME challenges, more than 15 integrated clinical based studies in CNS, 24 in CVS (including BSI), 23 in RTI, 28 in GIT (including hepatobiliary), 3 in kidney, 5 in genitourinary system, 15 in skin, soft tissue and musculoskeletal system, 3 in zoonotic and miscellaneous (belonging to 55 bacterial and fungal, 25 viral and 23 parasitic categories) have been incorporated to make a sound foundation of the infectious diseases in the budding doctors. They have been worked out in a systematic Q and A based format for clear understanding. An exclusive section on infection control and pandemic management has been incorporated. All key chapters in this book start with an opening vignette/clinical case; often with relevant quotations to convey the theme of the topic. Subsequently the topic is worked out systematically in Q-A format. This is done, so that the study becomes relevant and interactive and the relevance of the subject matter becomes clear to the student.

The book has been divided into 8 parts, which have been categorized into 17 Sections for the organization purpose. Parts 1 and 2 deal with general microbiology and immunology, respectively. There are more than 27 general microbiology (including infection control and pandemic management) and 15 immunology based clinical vignettes worked out in a systematic fashion. Both the sections are opening clinical vignette/integrated clinical case based in Q-A format. Part 3 deals with clinical infectious syndromes of various anatomical systems (already elaborated). Clinical Infectious syndromes part has been organized anatomical system wise with integrated clinical case based studies in Q-A format including references of clinical cases in appropriate sections/chapters.

Part 4 deals with bacterial diseases which have been divided into IVA-X sections. In these sections, before the integrated clinical case based studies are depicted, there are chapters devoted to the bacterial and disease characteristics, so that these can be applied and understood in the clinical cases. In each section the first chapter deals with classification and metabolic and microscopic features of bacteria, second with overview of media requirements, colonial characters and laboratory diagnosis characteristics, third with clinical profile (pathogenicity) and then the integrated clinical case based studies. The laboratory diagnosis and treatment (overview) profiles are provided towards the end part of each of the sections, just before the Assessment/Examination questions chapter.

Part 5 deals with viral diseases which has sections from XI to XIII. Section XI deals with general virology. Sections XII and XIII deal with infections due to DNA and RNA viruses, respectively. The latter two sections begin with overview of clinical profile, followed by integrated clinical based studies in Q-A format and end with outline of the laboratory diagnosis.

Part 6 deals with parasitic diseases. Section XIV deals with diseases caused by protozoans and Section XV deals with diseases caused by helminths. In both the sections, Chapter 2 deals with the morphological profile, Chapter 3 with the transmission/life cycle and host's profile, Chapter 4 with the clinical profile. In Section XV last three chapters deal with the laboratory diagnosis profile, treatment profile and assessment questions respectively, whereas in Section XVI these aspects have been dealt in Chapters 18, 19 and 21, respectively.

Part 7 deals with medical mycology (fungal diseases). Section XVI has been divided into six chapters for easy understanding of the mycological aspects. In it, Chapters 2 to 5 deal with the clinical units of mycoses. Each of this Chapter starts with a clinical based case study to highlight the key aspects to be followed by other aspects related to case theme/examination assessment.

Part 8, Section XVII deals with infection control and pandemic management module (microbiology component). In it, Chapters 1 to 7 deal with infection control and Chapters 8 to 14 with the pandemic module (includes two clinical studies on Covid-19). Each chapter starts with opening vignette/integrated clinical case based studies in Q-A format and has relevant quotations.

At places it appears that the information is getting duplicated, this is a deliberate attempt to reinforce some important information to the undergraduates, so that they remember it! The author has seen that many times students are not able to understand and retain the basic information, the material has been so arranged and depicted, that the student overcomes this difficulty and develops confidence. To ensure that the novice student does not get lost in the sea of microbiological information, all chapters have question and answer format (except those tabulating key microbiological information) and all sections are referenced with a list of key examination/assessment questions (to which references/answers are provided). This approach would be helpful especially to students, who lack command on the English language, but have to clear the examination in the English language.

Bacterial and viral outbreaks that have actually occurred in SE Asia are incorporated. Besides the coverage of the microbiological facts, the economic and the social implications involved in these episodes have also been highlighted.

The other key features of book include:

- Molecular biology aspects highlighted.
- Some original classical experiments described to maintain touch with history.
- All biochemical reactions/bacterial/viral vaccines covered in a compact tabular format.
- For examination purpose at places, short notes incorporated separately.
- Space is provided to incorporate new and changed concepts in the book.
- More than 50 quotations to inspire the student.
- Varying font size to grade varying importance of information.
- Footnotes provided for difficult terms.

Studying with understanding may be time consuming initially, but is a sound investment in the student's long medical career. It is with this in mind, the book has been presented. The author is confident that the student will retain more information, score well in the examination, develop a rational approach to the subject, be able to analyze microbiological data in clinical cases rationally in his medical career and continue to learn throughout his medical career.

A textbook should not merely provide information but should make it meaningful and realistic.

"A teacher...who has no living traffic with his knowledge but merely repeats his lesson to his students, can only load their minds, he cannot quicken them..."

—**Rabindranath Tagore**

I hope the challenges are met and the subject reclaims its importance both amongst the teachers and students. Any feedback or criticism would be welcome at my email—vsrandh@gmail.com

VS Randhawa

Acknowledgements

I am grateful to my teachers who have made me reach my present position. The notable amongst them include Dr DS Agarwal (Ex-Dean, Maulana Azad Medical College), Late Dr KB Sharma (formerly Regional WHO adviser), Dr VK Sharma, Dr Usha Baveja, Dr Beena Uppal, Dr Krishan Prakash, Dr Anita Chakravarty (HOD, MC; Hindu Rao) and Dr Mridu Dudeja (Jamia Hamdard MC). I am also indebted to Late Dr TD Chugh (Formerly, Kuwait Medical School) and Dr Anuj Sharma (Consultant WHO), who prodded me to portray the clinical component, as the core component in the text of microbiology for medical students. Critical feedback of Dr Rajesh Bhatia (Former Director, WHO SEARO) is highly appreciated.

I am also indebted to my colleagues in the Lady Hardinge with whom I regularly interacted, namely Dr Geeta Mehta, Dr M Deb, Dr Renu Dutta, Dr R Kaur, Dr BL Sherwal (currently Director, RGSH), Dr VL Malhotra (Currently faculty at BSA, MC Delhi), Dr Manoj Jais, Dr A Lakshmy, Dr Deepti Rawat, Dr Manoj Kumar and Dr Yogita Rai.

I am grateful to all the students of various institutions with whom I have interacted till date notably of Maulana Azad Medical College, New Delhi, SGPGIMS Lucknow, JN Medical College, Aligarh, Dr RML PGIMS and LHMC, New Delhi. A special mention of 5th semester students of LHMC 2017, 2018, and Nikhita Madan (MAMC) whose caricatures/cartoons poems/mnemonics have been incorporated in this text.

We are obliged to Public Health Image Library (public domain), CDC, Atlanta and other sites for the use of images. In medical textbook writing you are helped by many experts, besides being inspired by various personalities and learn in one's interaction with numerous luminaries. It would not be fair, if they are not acknowledged. These include: Dr Samant Ray, Dr Shobha Broor, Dr Gita Satpathy, Dr P Sugandhi Rao, Dr Rama Chaudhary (HOD, AIIMS, New Delhi), Dr Arti Kapil, Dr Lalit Dar, Dr BR Mirdha, Dr Urvashi, Dr Bimal Das, Dr Benu Dhawan, Dr Seema Sood, Dr Immaculata, Dr Gagandeep, Dr Ashish Kumar, Dr Nishant Verma, Dr ZU Khan, Dr HC Gugnani, Dr Iqbal Kaur (HOD, ESI MC, Faridabad), Dr Ashwani Kumar, Dr NP Singh (HOD, UCMS), Dr Rama Chandran, Dr Rajni Gaind (HOD, VMMC), Dr Balvinder Singh, Dr Malini Capoor, Dr Deepti, Dr Sonal Saxena (HOD, MAMC), Dr CP Baveja, Dr Surender Kumar, Dr Vikas Manchanda, Dr Rohit Chawla, Dr Dakshina Bisht (HOD, Santosh Medical College), Dr Ajoy Kumar, Dr Malini Sharif (HOD, VPCI), Dr Indu Shukla, Dr Harris M Khan, Dr Meher Rizvi, Dr Nandini Duggal (HOD, Dr RML PGIMS), Dr Mala Chaabra, Dr Rakesh Mahajan, Dr Nirmaljeet, Dr Shalini, Dr Poonam Sood (HOD, GBPH), Dr Archana Thakur, Dr Chand Wattal (HOD, SGRH), Dr Poonam Sood, Dr Sanjay Singhal (HOD ESI-PGIMSR, Basaidarapur), Dr R. Agarwal (Delhi Govt. Secretariat), Dr Jagdish Chander, Dr Varsha Gupta (HOD, GMC, Chandigarh), Dr Anil Kanga (DYSPGMC, Nahan), Dr Digvijay Singh (HOD, GMC, Mandi), Dr Poonam Gupta, Dr Rajeev Thakur (HOD, IBHAS), Dr Renu Goyal, Dr Manju Bala (HOD, NCDC), Dr Partho Ganguli, Dr Somenath, Dr Charu Prakash, Dr KN Prasad, Dr J Kishore, Dr Bharti Arora (HOD, MAMC, Agroha), Dr J Singh, Dr Sanjib Gogoi, Dr Sudesh Sharma (GMC, Jammu), Dr BN Harish, Dr Mannu Jain (HOD, SMIMER, Surat), Dr Summaiya A. Mulla (HOD, GMC, Surat), Dr Berry (CMC, Ludhiana), Dr Ciraj, Dr Chitra Pai (Antigua, West Indies), Dr Hem Lata, Dr S Sharma (HOD, SGRDIMS, Amritsar), Dr KD Singh, Dr MM Vegad (BJMC, Ahmedabad), Dr Neelam Khanna (HOD, Batra Hospital), Dr Sanjay Jain, Dr Radha Rani (Consultant, Indo-American Institute), Dr Namita Jaggi, Dr Ramesh Ranganathan (Gulf Medical Institute, UAE), Dr Nitya Vyas, Dr Bharti (HOD, SMS, Jaipur), Dr R Maheshwari, Dr RK Mishra, Dr Saroj Hooda, Dr Anita Singhal, Dr Rajendre Karadiya, Dr Gautam (PGIMER, Chandigarh), Dr R Sehgal (HOD, PGIMER), Dr RK Ratho (HOD, Virology, PGIMER), Dr Bhasker (HOD, AIIMS, Patna), Dr Binod Pati, Dr Anuradha Sharma (HOD, AIIMS, Bilaspur), Dr Vidhi Jain (AIIMS, Jodhpur), Dr Balamuruganvelu (HOD, GMC Bharatpur), Dr Shubhdeep Kaur, Dr Supriya (HOD, MC, Imphal), Dr Reema Nath, Prof Chamnjita, (HOD, MC Dibrugarh), Dr JK Das, Dr S. Gautam (HOD, BARC), Dr Shabbir Simjee (Technical Advisor, Eli Lilly), Dr Kamlesh Thakur (HOD, RPGMC, Tanda), Dr Manoj Kumar (HOD, RIMS, Ranchi), Dr Camilla Rodrigues (Consultant, PD Hinduja, Mumbai), Dr Pranay K Shah (BJMC, Ahmedabad), Dr Sharmila Sengupta, Dr MK Sen (HOD, Safdarjung Hospital), Dr Pratima Gupta (HOD, AIIMS, Rishikesh),

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I am also obliged to many of my students and residents, who currently occupy key faculty positions, Dr Neelam Taneja (PGIMER, Chandigarh), Dr Mandira (VPCI), Dr Anuradha Choudhary (VPCI), Dr Neeraj Goel (SGRH, New Delhi), Dr Nishant Verma, (AIIMS, New Delhi), Dr Rakesh Singh (JIPMER), Dr Suruchi Shukla (KGMU), Dr Neelam Gulati (GMC, Chandigarh), Dr Anuradha (PGIMER, New Delhi), Dr Jyotsna (SMIMS), Dr Prafulla Sonagara (MGMMC, Indore), Dr Pankaj Lal (Consultant, Liverpool Clinical Labs.), Dr Lavanya J. (CIMS, Chikkamagluru), Dr Mala Vinayak (LBSH), Dr Suchitra (Hi-Tech MC, Rourkela), Dr Ritu Singh Chauhan (WHO), Dr Ritu Singhal (LSR-TB Centre), Dr Sarika (CDC projects), Dr Surraiya (MC, Kanpur), Dr Shweta Bhagat (LHMC), Dr Gaurav Dhaka, Dr Meenakshi, Dr Suruchi, Dr Harman, Dr Vineet Khanna, Dr Priyam (AIIMS, New Delhi), Dr Nidhi (NCDC), Dr Dhara Shah (NCDC), Dr Madhulika, Dr Shivani Satia, Dr Trishla, Dr Debjani, Dr Anju (MGMMMS, Indore), Dr Nupur (Jamia Hamdard, MC), Dr Kanika, Dr Monica, Dr Anchan, Dr Kamaldeep, Dr Charu, Dr Shipra, Dr Sonam, Dr Bhawna (NACO), Dr Madhumita (ESI, DC), Dr Manoj (MC, Haldwani) Dr Nivedita, Dr Priyanka, Dr Garima, Dr Neha, Dr Sikander, Dr Suresh, Dr Imsen, Dr Anusha Rathi, Dr Snigdha, Dr Larinpari, Dr Indira, Dr Grace, Dr Masoom, Dr Fathima, Dr Srestha, Dr Shweta, Dr Sabyasachi. Dr Sarjana and Dr Amritesh. I also appreciate the inputs of my current postgraduates, Dr Anil, Dr Sudeshna, Dr Neelam, Dr Lekh Raj, Dr Anjan, Dr Chaavini, Dr Pooja, Dr Sandeep, Dr Anusha Sharma, Dr Aradhna, Dr Chavini and Dr Abheek.

Shri Satnam Singh for formatting the manuscript

Ms Gurpreet for the illustrations and figures.

Lastly, Mrs Rominder, my wife and son, Jasmeet, for bearing with me during the work.

VS Randhawa

List of Contents

<i>Preface to the Second Edition</i>	v
<i>Preface to the First Edition</i>	vii
PART 1: GENERAL MICROBIOLOGY	
Section I : General Microbiology	3–104
PART 2: IMMUNOLOGY	
Section II : Immunology	107–188
PART 3: INFECTIOUS DISEASES/SYNDROMES OF VARIOUS SYSTEMS	
Section III : Infectious Diseases/Syndromes of Various Systems (Cases and Case References)	191–246
PART 4 : BACTERIAL DISEASES	
Section IVA : Diseases Caused by Gram Positive Cocci	249–278
Section IVB : Diseases Caused by Gram Negative Cocci	279–290
Section V : Diseases Caused by Gram Positive Rods/Bacilli	291–338
Section VI : Diseases Caused by Gram Negative Bacilli [GNB]-Enterobacterales	339–368
Section VII : Diseases Caused by GNB Non-Fastidious, Oxidase +ve	369–381
Section VIII : Diseases Caused by GNB—Curved/Spiral Shaped	382–405
Section IX : Diseases Caused by GNB—Fastidious	406–427
Section X : Diseases Caused by GNB—Atypical/Unconventional/Obligate Intracellular Bacteria	428–451
PART 5 : VIRAL INFECTIONS	
Section XI : General Virology	455–486
Section XII : Infections due to DNA Viruses	487–530
Section XIII : Infections due to RNA Viruses	531–609
PART 6 : PARASITIC DISEASES	
Section XIV : Diseases Caused by Protozoans (Protozoology)	613–663
Section XV : Diseases Caused by Helminths (Helminthology)	664–718
PART 7 : FUNGAL DISEASES	
Section XVI : Medical Mycology (Fungal Diseases)	721–758
PART 8 : INFECTION CONTROL AND PANDEMIC MANAGEMENT MODULE	
Section XVII : Infection Control and Pandemic Management Module	759–832
Appendices: 1–6	833–859
Further Reading	859
<i>Index</i>	<i>860–868</i>

Detailed Contents

SECTION I: GENERAL MICROBIOLOGY

Opening Vignette/Integrated Clinical Case Based Q&A Studies

	Competencies	Pages
1. Introduction	MI 1.1	3
2. Staining Techniques and Microscopy	MI 1.1	10
3. Morphology of Bacteria	MI 1.1	16
4. Sterilization and Disinfection	MI 1.4, 1.5	25
5. Microbial Genetics: Step One (Basics of DNA–Structure and Function)	MI 1.1	35
Step Two (Variability in Microbes)		41
6. Microbial Growth and Metabolism	MI 1.1	52
7. Culture Media	MI 1.1	58
8. Culture Techniques and Growth Curve	MI 1.1	68
9. Identification of Microbes	MI 1.1	72
10. Detection of Microbes Based on Molecular Biology Techniques	MI 1.1, 8.9	77
11. Microbial Taxonomy	MI 1.1	84
12. Epidemiology of Infectious Diseases	MI 1.3	87
13. Microbial Pathogenicity	MI 1.3	92
14. Chemotherapy of Bacterial Diseases	MI 1.6	100
15. Assessment/Examination Questions		102

SECTION II: IMMUNOLOGY

Opening Vignette/Integrated Clinical Case Based Q&A Studies

1. Introduction to Immunology	MI 1.7	107
2. Innate Immunity	MI 1.7	110
3. Acquired/Adaptive/Specific Immunity	MI 1.7	116
4. Antigen	MI 1.7	120
5. Immunoglobulin (Antibody)	MI 1.8	125
6. Monoclonal Antibody	MI 1.10	131
7. Complement	MI 1.8	134

8.	Antigen–Antibody Reactions	MI 1.8	139
9.	Antibody Mediated Immunity	MI 1.8	150
10.	Cytokines	MI 1.7	155
11.	Human Leucocyte Antigen (HLA) System (MHC)	MI 1.7	158
12.	Cell Mediated Immunity	MI 1.8	160
13.	Hypersensitivity Reactions (Diseases)	MI 1.10	164
14.	Autoimmune Diseases	MI 1.10	176
15.	Immunology of Transplantation and Tumor Immunity	MI 1.11	180
16.	Immunodeficiency Diseases and Evaluation of Immune Status	MI 1.10	183
17.	Assessment/Examination Questions		186

SECTION III: INFECTIOUS DISEASES/SYNDROMES OF VARIOUS SYSTEMS (CASES/CASE REFERENCES)

Opening Vignette/Integrated Clinical Case Based Q&A Studies

1.	Specimen Collection, Transport and List Microbes (medical importance)	MI 8.9-8.13	191
2.	Central Nervous System Infections Including Eye	MI 5.1, 5.2, 5.3	194
3.	Cardiovascular System Infections and Bloodstream Infections	MI 2.1, 2.2, 2.3, 2.4	199
4.	Respiratory Tract Infections	MI 6.1	208
5.	Gastrointestinal Infectious Disease and Hepatobiliary Infections	MI 3.1, 3.3, 3.4, 3.5, 3.6, 3.7	214
6.	Urinary Tract Infections	MI 7.1, 7.3	220
7.	Genital Tract Infections	MI 7.2	225
8.	Skin, Soft Tissue and Musculoskeletal Infections	MI 4.1, 4.2, 4.3	229
9.	Anaerobic Infections	MI 4.1	232
10.	Potentially Oncogenic Pathogens	MI 8.3	237
11.	Miscellaneous (Zoonotic Infections and Arboviral Infections)	MI 8.1, 5.2	240
12.	Assessment/Examination Questions		244

BACTERIAL DISEASES

IVA to X

SECTION IVA: DISEASES CAUSED BY GRAM POSITIVE COCCI

1.	Classification, Metabolic and Microscopic Features of Gram Positive Cocci (GPC)	MI 1.1	249
2.	An Overview of the Media Requirements, Colonial Characters and Diagnostic Characteristics of Key Gram Positive Cocci	MI 1.1, 8.13	251
3.	Clinical (Pathogenicity) Profile of Infection Caused by Gram Positive Cocci	MI 1.1	253
4.	Integrated Clinical Case Based Study of Staphylococcus/Abscess	MI 4.2, 4.3	255
5.	Integrated Clinical Case Based Study of Staphylococcus/Cellulitis	MI 4.2, 4.3	260
6.	Integrated Clinical Case Based Study of <i>S. pyogenes</i> /Sore Throat	MI 4.3, 6.1	264

7.	Integrated Clinical Case Based Study of Enterococcus/Septicaemia		271
8.	Integrated Clinical Case Based Study of <i>S. 'viridans'</i> /Infective Endocarditis (I.E.)	MI 2.2	272
9.	Integrated Clinical Case Based Study of <i>S. pneumoniae</i> /Pneumonia	MI 6.1	273
10.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	276
11.	Assessment/Examination Questions		278

SECTION IVB: DISEASES CAUSED BY GRAM NEGATIVE COCCI

1.	Classification, Metabolic and Microscopic Features of Gram Negative Cocci (GNC)	MI 1.1	279
2.	An Overview of the Media Requirement, Colonial Characters and Diagnostic Characteristics of Key Gram Negative Cocci	MI 1.1, 8.13	280
3.	Clinical (Pathogenicity) Profile of Infections Caused by Gram Negative Cocci	MI 1.1	281
4.	Integrated Clinical Case Based Study of <i>N. meningitidis</i> /Meningitis	MI 5.1, 5.3	282
5.	Integrated Clinical Case Based Study of <i>N. gonorrhoeae</i> /Gonorrhoea	MI 7.1, 7.2	285
6.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	288
7.	Assessment/Examination Questions		290

SECTION V: DISEASES CAUSED BY GRAM POSITIVE RODS/BACILLI

1.	Classification, Metabolic and Microscopic Features of Key Gram Positive Bacilli	MI 1.1	291
2.	An Overview of the Media Requirements, Colonial Characters and Diagnostic Characteristics of Key Gram Positive Bacilli	MI 1.1, 8.13	295
3.	Clinical (Pathogenicity) Profile of Infection Caused By Gram Positive Bacilli	MI 1.1	297
4.	Integrated Clinical Case Based Study of <i>B. anthracis</i> /Anthrax	MI 4.3	302
5.	Integrated Clinical Case Based Study of <i>B. anthracis</i> /Pustule	MI 4.3	303
6.	Integrated Clinical Case Based Study of <i>C. diphtheriae</i> /Diphtheria	MI 6.1	305
7.	Integrated Clinical Case Based Study of <i>M. tuberculosis</i> /Pulmonary Tuberculosis 1	MI 6.1, 6.3	309
8.	Integrated Clinical Case Based Study of <i>M. tuberculosis</i> /Pulmonary Tuberculosis 2	MI 6.1, 6.3	312
9.	Integrated Clinical Case Based Study of Non-Tuberculous Mycobacteria/ Pulmonary Tuberculosis	MI 6.1, 6.3	317
10.	Integrated Clinical Case Based Study of <i>M. leprae</i> /Leprosy	MI 4.3	321
11.	Integrated Clinical Case Based Study of <i>C. perfringens</i> /Gas Gangrene	MI 4.1, 4.3	322
12.	Integrated Clinical Case Based Study of <i>C. perfringens</i> /Clostridial Myonecrosis	MI 4.1, 4.3	324
13.	Integrated Clinical Case Based Study of <i>C. tetani</i> /Neonatal Tetanus	MI 5.2	325
14.	Integrated Clinical Case Based Study of <i>C. botulinum</i> /Food Poisoning	MI 3.5	327
15.	Integrated Clinical Case Based Study of <i>C. difficile</i> /Diarrhoea	MI 3.1	329
16.	Integrated Clinical Case Based Study of Actinomyces/Actinomycosis	MI 4.3	331
17.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	333
18.	Assessment/Examination Questions		336

SECTION VI: DISEASES CAUSED BY GRAM NEGATIVE BACILLI-ENTEROBACTERALES

1.	Classification, Metabolic and Microscopic Features of Gram Negative Bacilli (GNB)	MI 1.1	339
2.	An Overview of the Media Requirements, Colonial Characters and Diagnostic Characteristics of Key Gram Negative Bacilli-Enterobacteriaceae	MI 1.1, 8.13	341
3.	Clinical (Pathogenicity) Profile of Infections Caused By Gram Negative Bacilli-Enterobacterales	MI 1.1	343
4.	Integrated Clinical Case Based Study of <i>E. coli</i> /Diarrhoea	MI 3.1	345
5.	Integrated Clinical Case Based Study of Shigella/Dysentery	MI 3.1	349
6.	Integrated Clinical Case Based Study of Salmonella/Enteric Fever	MI 3.3	352
7.	Integrated Clinical Case Based Study of Salmonella/Food Poisoning	MI 3.5	356
8.	Integrated Clinical Case Based Study of Yersinia/Plague	MI 3.1, 4.3, 6.1	359
9.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	363
10.	Assessment/Examination Questions		367

SECTION VII: DISEASES CAUSED BY GRAM NEGATIVE BACILLI-NON FASTIDIOUS, OXIDASE +ve

1.	Classification, Metabolic and Microscopic Features of Key Gram Negative Bacilli-Oxidase +ve	MI 1.1	369
2.	An Overview of the Media Requirements, Colonial Characters and Diagnostic Characteristics of Key Gram Negative Bacilli-Oxidase +ve (Non-fastidious)	MI 1.1, 8.13	371
3.	Clinical (Pathogenicity) Profile of Infections Caused by Gram Negative Bacilli, Non-Fastidious Oxidase +ve	MI 1.1	373
4.	Integrated Clinical Case Based Study of <i>P. aeruginosa</i> /Pyogenic Lesions	Mi 4.3	374
5.	Integrated Clinical Case Based Study of <i>Vibrio Cholerae</i> /Cholera	MI 3.1	376
6.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	379
7.	Assessment/Examination Questions		381

SECTION VIII: DISEASES CAUSED BY GRAM NEGATIVE BACILLI-CURVED/SPIRAL SHAPED

1.	Classification, Metabolic and Microscopic Features of Key Gram Negative Bacilli-Curved/Spiral Shaped	MI 1.1	382
2.	An Overview of the Media Requirements, Colonial Characters and Diagnostic Characterization of Key Gram Negative Bacilli-Curved/Spiral Shaped	MI 1.1, 8.13	384
3.	Clinical (Pathogenicity) Profile of Infections Caused by Key Gram Negative Bacilli-Curved/Spiral Shaped	MI 1.1	385
4.	Integrated Clinical Case Based Study of <i>T. pallidum</i> /Syphilis-Chancres	MI 7.1, 7.2	387
5.	Integrated Clinical Case Based Study of <i>T. pallidum</i> /Congenital Syphilis	MI 1.1	390
6.	Integrated Clinical Case Based Study of <i>T. pallidum</i> /Jarisch Herxheimer Reaction	MI 1.1	392
7.	Integrated Clinical Case Based Study of <i>T. pallidum</i> /Endemic Syphilis	MI 4.3	393
8.	Integrated Clinical Case Based Study of Leptospira/Leptospirosis	MI 8.1	394
9A.	Integrated Clinical Case Based Study of <i>Borrelia recurrentis</i> /Relapsing Fever	MI 8.1	396

9B.	Integrated Clinical Case Based Study of <i>Borrelia burgdorferi</i> /Lyme Disease	MI 4.3	397
10.	Integrated Clinical Case Based Study of <i>C. jejuni</i> /Campylobacteriosis	MI 3.5	398
11	Integrated Clinical Case Based Study of <i>C. jejuni</i> /Guillain-Barré Syndrome	MI 1.1	399
12.	Integrated Clinical Case Based Study of <i>H. pylori</i> /Acid Peptic Disease	MI 3.6	400
13.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	402
14.	Assessment/Examination Questions		405

SECTION IX: DISEASES CAUSED BY GRAM NEGATIVE BACILLI-FASTIDIOUS

1.	Classification, Metabolic and Microscopic Features of Key Gram Negative Bacilli-Fastidious	MI 1.1	406
2.	An Overview of the Media Requirements, Colonial Characters and Diagnostic Characteristics of Key Gram Negative Bacilli-Fastidious	MI 1.1, 8.13	408
3.	Clinical (Pathogenicity) Profile of Infections Caused by Key Gram Negative Bacilli-Fastidious	MI 1.1	411
4.	Integrated Clinical Case Based Study of <i>H. influenzae</i> /Meningitis	MI 5.1	413
5.	Integrated Clinical Case Based Study of Brucella/FUO	Mi 8.1	415
6.	Integrated Clinical Case Based Study of Bordetella/Pertussis	MI 6.1	417
7.	Integrated Clinical Case Based Study of Legionella/Legionellosis	MI 6.1	419
8.	Integrated Clinical Case Based Study of <i>Bartonella henselae</i> /Cat Scratch Disease	MI 4.3	421
9.	Integrated Clinical Case Based Study of Ehrlichia/Ehrlichiosis	MI 8.1	423
10.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	425
11.	Assessment/Examination Questions		427

SECTION X: DISEASES CAUSED BY ATYPICAL/UNCONVENTIONAL/OBLIGATE INTRACELLULAR BACTERIA

1.	Classification, Metabolic and Microscopic Features of Key Atypical/Unconventional/Obligate Intracellular Bacteria	MI 1.1	428
2.	An Overview of the Media Requirements, Colonial Characters and Laboratory Diagnostic Characteristics of Atypical/Obligate Intracellular Bacteria	MI 1.1, 8.13	430
3.	Clinical (Pathogenicity) Profile of Infections Caused by Atypical/Obligate Intracellular Bacteria	MI 1.1	432
4.	Integrated Clinical Case Based Study of <i>M. pneumoniae</i> /Community Acquired Pneumonia	MI 6.1	433
5.	Integrated Clinical Case Based Study of <i>R. prowazekii</i> /Epidemic Typhus	MI 1.1	436
6.	Integrated Clinical Case Based Study of <i>R. rickettsii</i> /Rocky Mountain Fever	MI 4.3	438
7.	Integrated Clinical Case Based Study of <i>O. tsutsugamushi</i> /Scrub Typhus	MI 4.3	440
8.	Integrated Clinical Case Based Study of <i>C. trachomatis</i> /Pelvic Inflammatory Disease	MI 7.1, 7.2	442
9.	Integrated Clinical Case Based Study of <i>C. trachomatis</i> /Trachoma	MI 1.1	444

10.	Integrated Clinical Case Based Study of <i>C. psittaci</i> /Psittacosis	MI 6.1	446
11.	Laboratory Diagnosis and Treatment (Overview)	MI 1.1, 8.9, 8.13, 1.6	448
12.	Assessment/Examination Questions		451

VIRAL INFECTIONS

XI to XIII

SECTION XI: GENERAL VIROLOGY

Opening Vignette/Integrated Clinical Case Based Q&A Studies

1.	General Properties of Viruses	MI 1.1	455
2.	Pathogenesis of Viral Infections	MI 1.1	470
3.	Bacteriophage	MI 1.1	477
4.	Laboratory Diagnosis of Viral Diseases (General Principles and Techniques)	MI 1.1, 8.9, 8.13	481
5.	Antiviral Drugs	MI 1.6	484
6.	Assessment/Examination Questions		486

SECTION XII: INFECTIONS DUE TO DNA VIRUSES

1.	Overview of Clinical Profile (Pathogenicity) of DNA Viral Infections	MI 1.1	487
2A.	Integrated Clinical Case Based Study of Parvovirus B-19 Virus	MI 4.3	490
2B.	Integrated Clinical Case Based Study of HPV/Cervical Cancer/Wart	MI 7.1, 7.2	493
3.	Integrated Clinical Case Based Study of Adenovirus/Diarrhoea	MI 3.1	496
4.	Integrated Clinical Case Based Study of Smallpox (Variola Major/Accidental Outbreak)	MI 4.3	499
5.	Integrated Clinical Case Based Study of HHV-2/Genital Lesion	MI 7.1, 7.2	502
6.	Integrated Clinical Case Based Study of HHV-3 (Varicella Pox)/Skin Lesion	MI 4.3	508
7.	Integrated Clinical Case Based Study of HHV-4 (EBV)/Infectious Mononucleosis	MI 6.1	512
8.	Integrated Clinical Case Based Study of HHV-5 (CMV)/Pneumonitis	MI 6.1	516
9.	Integrated Clinical Case Based Study of Hepatitis B Virus/Jaundice	MI 3.7, 3.8	520
10.	An Outline of Laboratory Diagnosis of Key DNA Viral Infections	MI 1.1, 8.9, 8.13	527
11.	Assessment/Examination Questions		529

SECTION XIII: INFECTIONS DUE TO RNA VIRUSES (INCLUDING HDV AND PRIONS)

1.	Overview of Clinical Profile (Pathogenicity) of RNA Viral Infections	MI 1.1	531
2A.	Integrated Clinical Case Based Study of Rotavirus/Diarrhoea	MI 3.1	533
2B.	Integrated Clinical Case Based Study of Influenza Virus/Influenza	MI 6.1	536
3.	Integrated Clinical Case Based Study of Influenza Virus/'Avian Flu'	MI 6.1	542
4.	Integrated Clinical Case Based Study of Influenza Virus/'Swine Flu'	MI 6.1	544
5.	Integrated Clinical Case Based Study of Respiratory Syncytial Virus/Bronchiolitis	MI 6.1	546

6.	Integrated Clinical Case Based Study of Measles Virus/Skin Rash	MI 4.3	549
7.	Integrated Clinical Case Based Study of Rabies Virus/Rabies	MI 5.2, 8.1	553
8.	Integrated Clinical Case Based Study of Hepatitis A Virus/Jaundice	MI 3.7, 3.8	560
9.	Integrated Clinical Case Based Study of Poliovirus/Poliomyelitis	MI 1.1	563
10.	Integrated Clinical Case Based Study of Hepatitis E Virus/Outbreak	MI 3.7, 3.8	569
11.	Integrated Clinical Case Based Study of Rubella Virus/Congenital Rubella	Mi 1.1	571
12.	Integrated Clinical Case Based Study of Dengue Virus/Dengue Haemorrhagic Fever	Mi 8.1	573
13.	Integrated Clinical Case Based Study of Japanese Encephalitis Virus/ Japanese Encephalitis	MI 5.2	575
14.	Integrated Clinical Case Based Study of Hepatitis C Virus/Jaundice	MI 3.7, 3.8	579
15.	Integrated Clinical Case Based Study of Human Immunodeficiency Virus/AIDS	MI 2.7	583
16.	Integrated Clinical Case Based Study of HDV/Jaundice	MI 3.7	597
17.	Integrated Clinical Case Based Clinical Prions/Outbreak of Bovine Spongiform Encephalopathy (BSE)	MI 5.2	599
18.	A Outline of Laboratory Diagnosis of Key RNA Viruses	MI 1.1, 8.9, 8.13	602
19.	Assessment/Examination Questions		606

PARASITIC DISEASES

XIV to XV

SECTION XIV: DISEASES CAUSED BY PROTOZOANS

1.	Introduction to Parasitology	MI 2.5, 1.1, 2.6	613
2.	Introduction to Protozoology and An Overview of the Morphological Profile of Key Protozoans.	MI 2.5, 1.1, 2.6	618
3.	An Overview of the Transmission/Life Cycle and Host's Profile of Protozoans.	MI 2.5, 1.1, 2.6	626
4.	An Overview of Clinical Profile (Pathogenicity) of Infections Caused by Protozoan Parasites	MI 2.5, 1.1, 2.6	631
5.	An Integrated Clinical Case Based Study on <i>E. histolytica</i> /Amoebiasis	MI 2.5, 1.1, 2.6	634
6.	An Integrated Clinical Case Based Study on <i>E. histolytica</i> /Amebic Liver Abscess	MI 2.5, 1.1, 2.6	638
7.	An Integrated Clinical Case Based Study on <i>G. lamblia</i> /giardiasis	MI 2.5, 1.1, 2.6	640
8.	An Integrated Clinical Case Based Study on <i>T. vaginalis</i> /Trichomoniasis	MI 2.5, 1.1, 2.6	642
9.	An Integrated Clinical Case Based Study on <i>L. donovani</i> / Visceral Leishmaniasis	MI 2.5, 1.1, 2.6	644
10.	An Integrated Clinical Case Based Study on <i>P. vivax</i> /Malaria	MI 2.5, 1.1, 2.6	646
11.	An Integrated Clinical Case Based Study on <i>P. falciparum</i> /Pernicious Malaria	MI 2.5, 1.1, 2.6	650
12.	An Integrated Clinical Case Based Study on <i>T. gondii</i> /Toxoplasmosis	MI 2.5, 1.1, 2.6	653
13.	An Integrated Clinical Case Based Study on <i>Cryptosporidium</i> spp./ Cryptosporidiosis	MI 2.5, 1.1, 2.6	655

14.	An Integrated Clinical Case Based Study on <i>B. coli</i> /Balantidiasis	MI 2.5, 1.1, 2.6	656
15.	An Overview of the Approach to Laboratory Diagnosis of Protozoans	MI 2.5, 1.1, 2.6	657
16.	An Overview of the Drugs Used Against Protozoal Infection	MI 2.5, 1.1, 2.6	660
17.	Assessment/Examination Questions and References/Answer.		662

SECTION XV: DISEASES CAUSED BY HELMINTHS

1.	Introduction to Helminthology	MI 2.5, 1.1, 2.6	664
2.	An Overview of the Morphological Profile of Key Helminths	MI 2.5, 1.1, 2.6	667
3.	An Overview of the Transmission/Life Cycle (hosts) Profile of Helminths	MI 2.5, 1.1, 2.6	672
4.	An Overview of the Clinical Profile (pathogenicity) of Infections Caused by Helminths	MI 2.5, 1.1, 2.6	675
5.	An Integrated Clinical Case Based Study on <i>T. solium</i> /Taeniasis	MI 2.5, 1.1, 2.6	679
6.	An Integrated Clinical Case Based Study on <i>T. solium</i> /Cysticercosis	MI 2.5, 1.1, 2.6	681
7.	An Integrated Clinical Case Based Study on <i>E. granulosus</i> /Hydatid cyst	MI 2.5, 1.1, 2.6	683
8.	An Integrated Clinical Case Based Study on <i>D. latum</i> /Diphyllobothriasis	MI 2.5, 1.1, 2.6	685
9.	An Integrated Clinical Case Based Study on <i>P. westermani</i> /Paragonimiasis	MI 2.5, 1.1, 2.6	687
10.	An Integrated Clinical Case Based Study on <i>F. buskii</i> /Fasciolopsis	MI 2.5, 1.1, 2.6	688
11.	An Integrated Clinical Case Based Study on <i>E. vermicularis</i> /Enterobiasis	MI 2.5, 1.1, 2.6	689
12.	An Integrated Clinical Case Based Study on <i>A. lumbricoides</i> /Ascariasis	MI 2.5, 1.1, 2.6	690
13.	An Integrated Clinical Case Based Study on <i>A. duodenale</i> / Hookworm Infection	MI 2.5, 1.1, 2.6	695
14.	An Integrated Clinical Case Based Study on <i>S. stercoralis</i> /Strongyloidiasis	MI 2.5, 1.1, 2.6	698
15.	An Integrated Clinical Case Based Study on <i>W. bancrofti</i> /Filariasis	MI 2.5, 1.1, 2.6	700
16.	An Integrated Clinical Case Based Study on <i>T. spiralis</i> /Trichinellosis	MI 2.5, 1.1, 2.6	703
17.	An Integrated Clinical Case Based Study on Visceral Larva Migrans	MI 2.5, 1.1, 2.6	705
18.	An Overview of the Approach to Laboratory Diagnosis of Helminths Diseases	MI 2.5, 1.1, 2.6	706
19.	An Overview of the Drugs Used Against Helminths	MI 2.5, 1.1, 2.6	711
20.	Ectoparasites	MI 2.5, 1.1, 2.6	713
21.	Assessment/Examination Questions and Reference/Answers		716

FUNGAL DISEASES

XVI to XVII

SECTION XVI: MEDICAL MYCOLOGY

1.	General Aspects Including Classification and Laboratory Diagnosis	MI 1.1	721
2.	Integrated Clinical Case Based Study on Superficial and Cutaneous Mycoses	MI 4.3	729
3.	Integrated Clinical Case Based Study on Subcutaneous Mycoses	MI 4.3	734
4.	Integrated Clinical Case Based Study on Systemic Mycoses	MI 6.1	739

5.	Integrated Clinical Case Based Studies on Opportunistic and Miscellaneous Mycoses	MI 8.2, 1.1	745
6.	Assessment/Examination Questions		758

**SECTION XVII: INFECTION CONTROL AND PANDEMIC MANAGEMENT MODULE
(MICROBIOLOGY COMPONENTS)**

Opening Vignette/Integrated Clinical Case Based Q&A Studies

1.	Normal Human Flora	MI 1.1	761
2.	Vehicles (Including Microbiological Testing of Water and Air) and Transfusion Transmitted Infections (TTI)	MI 1.1, 8.11, 8.8, 8.16	766
3.	Healthcare Associated Infections–HAIs	MI 8.5, 8.6, 8.7	770
4.	Opportunistic Infections	MI 8.2	778
5.	Biomedical Waste Management	MI 8.5, 8.6	780
6.	Antimicrobial Resistance	MI 1.6	783
7.	Antimicrobial Susceptibility Tests	MI 1.6	792
8.	Introduction to Pandemics	(Pandemic module)	798
9.	Emerging and Re-emerging Diseases	MI 8.4	799
10.	Integrated Clinical Based Study on SARS-CoV-2, Case 1	6.1 and Pandemic module	801
11.	Integrated Clinical Based Study on SARS-CoV-2, Case 2	6.1 and Pandemic module	804
12.	Bioterrorism	MI 1.1	809
13.	Microbial Typing Techniques	MI 8.15	810
14.	Genetic Engineering	MI 1.1 and Pandemic module	813
15.	Vaccines	MI 1.9	818
16.	Assessment/Examination Questions		830
<i>Appendices:</i>			
1.	Pandemic Management Module		833
2.	AETCOM (including two case scenarios)	MI 8.12, 8.14	834
3.	Internet Resources		835
4.	National Health Programs	MI 8.16	839
5.	Single Response Assessment/Examination Questions and Answers of Sections 1–17		840
6.	Sample Paper		858
<i>Further Reading</i>			859
<i>Index</i>			860