



June 2022

BLUEPRINT FOR FC PATH (SA) MICRO PART 1 EXAMINATION

1. PART 1 Micro Examination

Introduction to fundamentals of clinical microbiology including characteristics of microorganisms, laboratory diagnostics including molecular basic principles, laboratory safety, and prevention and control of infections

2. FORMAT OF THE WRITTEN EXAMINATION

The examination will consist of two written papers, each of 3 hours duration.

Paper 1 will consist of single best answer questions (SBA).

Paper 2 will consist of 5 marks short answer questions (SAQs) .

The sub minimum pass mark for each paper is 50%, and each paper must be passed.

Content and breakdown of the written examination:

- Fundamentals of microbiology (30%)
 - Basic microbial structure, growth and metabolism
 - pathogenesis,
 - virulence mechanisms,
 - antimicrobials and antimicrobial resistance
- Laboratory diagnostics (30%)
 - specimen collection, transport, processing, susceptibility testing
 - principles and interpretation of routine laboratory tests
 - laboratory safety
 - quality assurance
- Molecular principles (10%)
- Virology (5%)
- Basic Immunology and vaccines (5%)
- Clinical syndromes (10%)
- Prevention and control of infections in the hospital and community (10%)

3. CORE TRAINING PROGRAMME FOR PART 1

Content will be expected to be covered at 3 different levels, for the part I exam:

Exposure – candidate has been exposed to the topic, and has a superficial understanding of the principles, but should be able to outline core ideas

Knowledge – candidate has core in depth knowledge of the content, although without necessarily the skills and competence to reliably apply these in a clinical setting.

Competence – candidate has in depth knowledge and skills, and is fully familiar with the content as well as application of the content.

3.1 **Fundamentals of microbiology (Scientific basis of microbiological pathology) (competence unless otherwise specified)**

- Microbial structure, physiology and genetics
- Microbial taxonomy, classification and typing methods
- The diversity of microbial metabolism
- Microbial pathogenesis
- Antimicrobial agents, their mode of action, mechanisms of microbial resistance (phenotypic and genotypic) and spectrum/ indications

3.2 **Laboratory diagnostics**

3.2.1 **Laboratory safety (competence unless otherwise specified)**

- Local and national procedures for the safe transport of specimens or cultures (knowledge)
- BSC & BSL / PPE, safe laboratory practice
- Safety requirements regarding laboratory design (exposure)
- Safe waste disposal

3.2.2 **Handling of specimens: (competence unless otherwise specified)**

a) **Pre-analytical phase**

- Be aware, for each specimen type, of the optimal methods for collection, transport (including transport media), storage, reception, identification and documentation, including the requirements for high-risk specimens
- Be able to assess degrees of urgency for the processing of specimens, including the provision for an out of hours service and the communication of preliminary results

b) **Microscopy / Rapid tests: (competence)**

- Understand the principles of light microscopy, and be competent in the use of a light microscope
- Be able to perform routine staining techniques (Gram, auramine, Ziehl-Neelsen) and other stains (including malaria) / wet prep / cell counts
- Reading and interpretation of stained preparations.
- Know when urgent microscopy / rapid tests are indicated

c) **Culture methods: (competence)**

- Know the principles of **commonly** used selective, enrichment and differential media available for general and specialised use and be able to choose relevant media in common use in medical laboratories
- Know growth requirements of micro-organisms including atmosphere and optimal temperature and have an appreciation of the growth kinetics of both solid phase and broth cultures.
- Be able to process common specimens, recognise common potential pathogens from a mixture of colonies on culture plates, and separate such colonies in order to achieve the pure growth necessary for further work.

d) **Identification methods and further processing of cultures: (competence)**

- Be able to perform tests leading to the identification of common pathogens including the use of commercially produced kits (eg enzyme assays), latex agglutination and rapid diagnostic kits plus benchside tests (catalase,oxidase, rapid indole, API system etc..)
- Understand the principles of identification media and be able to use them appropriately
- Understand the principles of automated systems including blood culture and microbial ID systems (knowledge)

e) **Antimicrobial investigations: (competence unless otherwise specified)**

- Be able to test the antibiotic sensitivities of an isolate using the common techniques of disc diffusion and gradient diffusion testing.
- Interpretation of AST results for common pathogens
- Understand principles of antimicrobial susceptibility testing methods and have knowledge of antibiotic stewardship. (Knowledge)

- Understand principles of commonly used automated systems including vitek etc.. (knowledge)

f) **Quality Assurance**

- Relevant QC/QA principles for all above tests (knowledge)
- Accreditation principles (exposure)

4. **Molecular principles (knowledge)**

The trainee should:

- Be familiar with basic molecular biology principles: DNA, RNA and protein structure and function; transcription and translation; DNA replication; mobile genetic elements.
- Understand the principles of common molecular techniques: e.g. gel electrophoresis; quantitative and qualitative PCR; use of probes and hybridisation; sequencing and typing.

5. **Virology (knowledge)**

The trainee should:

- Have an understanding of viral structure and pathogenesis
- Be able to describe common viral infections with regards to aetiology, epidemiology, clinical presentation, diagnosis, management (knowledge)
- Be familiar with basic diagnostic virology methodology including principles of serological and molecular methods

6. **Immunology and Vaccines (Knowledge)**

- Host defense mechanisms and immune responses to infection (knowledge)
- Principles of vaccine development and use

7. **Clinical syndromes**

Trainees should have an understanding of **common important infectious diseases (of bacterial, parasitic, fungal origin)** both community and hospital acquired **and clinical syndromes** related to infection, with regard to aetiology, epidemiology, clinical presentation, diagnosis, management (knowledge)

- CNS infections
- Upper and lower respiratory tract infections
- Eye infections
- TB
- Cardiovascular system (bacteraemia & septicaemia, infective endocarditis; Rheumatic fever, rheumatic heart disease and myocarditis)
- Intra-abdominal infections (including peritonitis and liver infections).
- Gastro-enteritis and dysentery
- Skin and soft tissue infections
- Bone and joint infections
- Sexually transmitted infections
- Urinary tract infections (including schistosomiasis)
- Vectorborne disease and zoonoses

8. **Infection prevention and control in hospital and community: (knowledge)**

The trainee should:

- Have basic understanding of sterilisation and disinfection
- Have a basic understanding of the functions of the hospital infection control practitioner
- Understand the difference between standard and transmission based precautions, and when they are applied
- Identify common conditions and/or organisms that require infection control intervention
- Have a basic understanding of the role of the laboratory in surveillance and managing a hospital outbreak