FC Path(SA) Micro

THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain
Reg No 1955/000003/08

Examination for the Fellowship of the College of Pathologists of South Africa – Microbiology

Paper 1 27 February 2020 (3 hours)

All questions are to be answered. Each question to be answered in a separate book (or books if more than one is required for the one answer)

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1 a) Discuss the common mechanisms and the respective genes for antimicrobial resistance in Multi Drug Resistant (MDR) *Acinetobacter baumannii*. (10)

b) i) Describe the key pharmacodynamic characteristics that differentiate different antibiotics and state the pharmacokinetic-pharmacodynamic indices that can best be used to determine the likely effectiveness of each group. (5)

ii) Apply these principles to the use of combination therapy including carbapenems for the treatment of serious infections due to carbapenem resistant Enterobacteriaceae. (5)

[20]

2 a) Discuss Toxoplasmosis under the disease spectrum, risk factors, approach to laboratory diagnosis and management. (10)

b) Critically appraise the syphilis screening algorithms. (10)

[20]

3 a) Describe the mechanisms of neutrophil killing of bacteria. (5)

b) Discuss molecular mimicry in the pathogenesis of diseases highlighting one disease as an example. (5)

c) Discuss the advantages and challenges/ limitations of introducing syndromic panel-based molecular diagnostics into routine microbiology practice, focusing particularly on respiratory panels. (10)

[20]

4 a) Describe the processes of the (i) collection, (ii) packaging, and (iii) transport of laboratory samples potentially containing high-risk pathogens such as Ebolavirus. (10)

b) Giving suitable examples explain what is meant by the following. In your answer, please indicate how quality assurance and quality control differ (10)

i) Quality assurance.

ii) Quality control.

[20]

5 Choose 2 out of the following 3 questions

a) Discuss the association of human papillomavirus (HPV) with oncogenesis and the available intervention strategies. (10)

b) Discuss the disease spectrum and management approaches to Herpes simplex virus type 2 infections. (10)

c) Describe the spectrum and management of HIV neurocognitive disorders. (10)

[20]

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Paper 2 | 28 February 2020 | (3 hours)

All questions are to be answered. Each question to be answered in a separate book (or books if more than one is required for the one answer)

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1 a) Explain how you would design and conduct a point-prevalence survey for healthcare-associated infections. (10)
b) List the factors that can cause the failure of a disinfection process. (5)
c) What are the characteristics of the 'ideal disinfectant'? (5)
[20]

2 a) Discuss the utility of the Gene Expert Ultra assay in South Africa, highlighting the pros and cons of the test. (10)
b) Critically appraise the WHO long and short course regimens for the treatment of MDR-TB in the South African context. (10)
[20]

3 a) Using suitable microorganisms as examples, explain the differences between *emerging*, *re-emerging* and *novel* infectious diseases. (5)
b) You are requested to validate a new multiplex PCR assay for the rapid detection of Ebola virus, Lassa virus, malaria and typhoid diseases. Describe how you would perform a validation of this assay with the view of introducing it in a field laboratory in Guinea. (10)
c) Define what is meant by the 'systemic inflammatory response syndrome' and indicate the clinical symptoms, signs and laboratory indicators of 'septic shock'. (5)
[20]

4 a) i) Outline the principles of antimicrobial stewardship. (5)
ii) Apply these principles to the use of antifungals for patients in a medical ICU i.e. non-surgical ICU. (10)
b) Write short notes on <u>one</u> of the following three novel vaccines. Notes should include the nature and composition of the vaccine, indications and settings for use, likely efficacy (5)
i) rVSV-ZEBOV Ebola virus vaccine.
ii) RTS,S/AS01 Malaria vaccine.
iii) Cholera vaccine.
[20]

5 a) Compare and contrast vancomycin and two newer agents for the treatment of serious Gram-positive infections, other than *Clostridium difficile*, i.e. NOT C. difficile. (10)
b) Discuss the process you would go about in preparing a laboratory for accreditation. (10)
[20]