

POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

POSTGRADUATE DIPLOMA IN MEDICAL MICROBIOLOGY
EXAMINATION – DECEMBER 2019

Date: 13th December 2019

Time: 1.00 p.m. – 4.00 p.m.

STRUCTURED ESSAY PAPER

Answer all questions

Answer each question in a separate book.

Write the index number in each answer book.

1.

1.1. Laboratories are a special type of work environment that should take precautions to ensure the safety of the laboratory staff, public and environment from infectious material.

1.1.1. What is the minimum biosafety level of a clinical microbiology laboratory?
(5 marks)

1.1.2. Describe engineering controls (design features and safety equipment) that are found in a clinical microbiology laboratory to ensure biosafety.
(25 marks)

1.1.3. Outline, giving reasons, the personal protective equipment (PPE) and safety equipment you need to process a sputum sample from a patient suspected of having community acquired pneumonia.
(10 marks)

1.1.4. State the types of waste generated in a clinical microbiology laboratory, giving examples. Briefly describe the methods of disposal of each.
(25 marks)

Contd.....2/-

- 1.2. *Bacillus anthracis* has the potential to be used in biological warfare.
- 1.2.1. Briefly describe the pathogenesis and clinical features of anthrax transmitted by inhalation. (25 marks)
- 1.2.2. What is the biosafety level required to perform laboratory tests to isolate *Bacillus anthracis*? (5 marks)
- 1.2.3. List the post exposure prophylaxis methods available for the victims of a bioterrorist attack involving anthrax spores. (5 marks)
2. Several types of culture media are used in the clinical microbiology laboratory to ensure bacterial isolation from clinical specimens and help in preliminary identification
- 2.1 List the types of culture media used in bacterial diagnosis (10 marks)
- 2.2 Briefly describe each **type** of culture media, giving two (2) examples for each. (40 marks)
- 2.3 Describe the quality control measures taken in a clinical microbiology laboratory to ensure the satisfactory performance of culture media. (40 marks)
- 2.4 Name three (3) culture media used specifically in anaerobic bacteriology. (10 marks)

Contd.....3/-

3.

3.1 A 22-year-old university student developed high fever and coryza of 5 days duration. She had a maculopapular rash and enanthema on the buccal mucosa. There was a contact history of measles at the university.

3.1.1 Outline the samples that should be obtained from this student to make an aetiological diagnosis. (10 marks)

3.1.2 In the context of Sri Lanka being in the measles elimination phase, list the tests that should be performed on the samples you mentioned in 3.1.1, briefly describing the rationale/justification of each test. (30 marks)

3.2 Varicella is a highly contagious infection. It could be prevented by offering prophylaxis to contacts following exposure.

3.2.1 Name three modes of prophylaxis available to contacts for varicella infection (10 marks)

3.2.2 Briefly describe the mechanism of prophylaxis of one of the modes mentioned in 3.2.1 (25 marks)

3.2.3 Outline the pathogenesis of herpes zoster (25 marks)

4.

4.1 Describe briefly the effector mechanisms of antibodies in host defence against infection. (50 marks)

4.2 Outline the anatomical distribution of the different isotypes of antibodies. (20 marks)

4.3 Explain how the anatomical distribution and effector functions of the different isotypes of antibodies play a role in host defence against infections. (30 marks)

5. A 37-year-old male presented to Kilinochchi General Hospital with fever for 2 weeks. On admission he was drowsy and gave a history of two episodes of convulsions. The clinician suspected malaria in this patient.

5.1 What is the most likely species of malaria parasite in this patient?
(5 marks)

5.2 What are the important aspects that you would like to elicit in the history and examination?
(15 marks)

5.3 Name three (3) routine laboratory tests performed to diagnose malaria. Briefly discuss the advantages and disadvantages of each test that you have mentioned.
(30 marks)

5.4 Outline the further management of this patient.
(20 marks)

5.5 Briefly discuss the epidemiological significance of this case in the current context of malaria in Sri Lanka.
(30 marks)

6.

6.1 Echinocandins are a new group of antifungal agents.

6.1.1 List the different derivatives of echinocandins.
(10 marks)

6.1.2 Briefly describe the mode of action, spectrum of activity, indications for use, mode of administration and pharmacokinetics of echinocandins.
(30 marks)

6.2 List the causative agent/s and describe the epidemiology, clinical manifestations, laboratory diagnosis and antifungal treatment of basidiobolomycosis.
(60 marks)