

**POSTGRADUATE INSTITUTE OF MEDICINE**  
**UNIVERSITY OF COLOMBO**

**POSTGRADUATE DIPLOMA IN MEDICAL MICROBIOLOGY**  
**EXAMINATION – DECEMBER 2014**

**Date:** 9<sup>th</sup> December, 2014

**Time:** 9.00 a.m. – 12.00 noon

**STRUCTURED ESSAY PAPER**

Answer all **six (06)** questions.

Answer each question in a separate book.

1. Antibiotic resistance is a common problem in clinical practice.
  - 1.1 Discuss the role of bacteriophages in the transmission of antibiotic resistance. (45 marks)
  - 1.2 Describe the structure of the gram negative bacterial cell wall. (20 marks)
  - 1.3 Briefly describe how the structural changes in the bacterial cell wall result in antibiotic resistance. (15 marks)
  - 1.4 What is intrinsic resistance? Explain with examples. (20 marks)
  
2. Listeriosis is an important food-borne disease.
  - 2.1 Name **four (04)** other bacterial pathogens which are transmitted by food. (20 marks)
  - 2.2 Briefly describe other clinical presentations of listeriosis with relevant clinical samples you would collect to establish the diagnosis. (40 marks)
  - 2.3 What steps should be taken to control food-borne listeriosis? (40 marks)

3. A 25 year old nursery school teacher who was 12 weeks pregnant presented with fever and erythematous macular rash of 1 day duration. She has received a single dose of rubella vaccine during her school days.
- 3.1 The obstetrician suspected rubella virus infection in this patient.  
Give **two (02)** reasons for his suspicion (15 marks)
- 3.2 What samples would you collect from this patient to diagnose rubella virus infection? (15 marks)
- 3.3 Name the tests available for the diagnosis of rubella virus infection. (20 marks)
- 3.4 Name **four (04)** other viruses that can cause a similar clinical presentation. (10 marks)
- 3.5 How would you diagnose the infections caused by the viruses mentioned in (3.4)? (30 marks)
- 3.6 Name **three (03)** viruses other than rubella virus that can cause intra uterine infection. (10 marks)
4. 4.1 Compare
- 4.1.1. antigen recognition by B lymphocytes and T lymphocytes (30 marks)
- 4.1.2. the effector functions of natural killer cells and cytotoxic lymphocytes (30 marks)
- 4.2. State biological functions of
- 4.2.1 antibodies (20 marks)
- 4.2.2 complement (20 marks)

5. In the following clinical scenarios, state the likely mycological diagnosis, list the fungal aetiological agent/s and briefly outline the laboratory diagnosis including collection and transport of specimens.
- 5.1 A 40 year old male who developed headache followed by drowsiness, dizziness, irritability, confusion and neck stiffness over three weeks. (35 marks)
- 5.2 A 45 year old farmer presented with swelling of the right sole of the foot and sinuses discharging sero-sanguinous fluid containing granules. (35 marks)
- 5.3 A 50 year old post renal transplant patient presented with fever, non productive cough and progressive exertional dyspnoea. (30 marks)
- 6.
- 6.1. A 32 year old HIV infected patient presented with profuse, watery diarrhoea for 3 months. Bacterial culture of faeces did not yield any pathogen. Direct smear and concentrated faecal samples were negative for amoebae, ova and cysts. Modified acid-fast stain of faeces revealed unevenly stained, round pink structures of 4-6 microns in size.
- 6.1.1 What is the most likely protozoan parasite found in the faecal smear? (10 marks)
- 6.1.2 Name the parasitic stage seen in this smear. (05 marks)
- ~~6.1.4~~ ~~6.1.3~~ How do you morphologically differentiate these **three (03)** parasites from each other? (10 marks)
- ~~6.1.6~~ ~~6.1.4~~ What measures can be taken to prevent this infection? (10 marks)
- ~~6.1.3~~ ~~6.1.5~~ State **two (02)** other protozoans which could be found in a modified acid-fast stained smear of human faecal samples. (10 marks)
- ~~6.1.5~~ ~~6.1.6~~ How is the parasite mentioned in (6.1.1) transmitted to humans? (5 marks)

- 6.2. A 60 year old lady presented to a medical clinic, **six (06)** months after returning from a pilgrimage to North India. She complained of high fever with chills and rigors, night sweats, fatigue and weight loss of 3kg in one month. A physical examination revealed a moderately enlarged spleen.

Laboratory investigations showed leucopaenia, normochromic-normocytic anaemia and moderate thrombocytopaenia. A high erythrocyte sedimentation rate (ESR) and an insignificant C-reactive protein level were also noticed. Her urine and blood cultures were repeatedly negative.

- 6.2.1 What is the most likely parasitological diagnosis?  
(5 marks)
- 6.2.2 What are the investigations you would request to confirm your diagnosis?  
(15 marks)
- 6.2.3 Explain the drug treatment and follow up of this patient.  
(30 marks)