

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR
OF SCIENCE IN BIOMEDICAL SCIENCE AND TECHNOLOGY

BMET 334: MEDICAL BACTERIOLOGY AND MYCOLOGY

STREAMS: BSC (BMED) Y3S1

TIME: 2 HOURS

DAY/DATE: FRIDAY 26/03/2021

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

- Answer question ONE and any other TWO questions
- Do not write on the question paper

QUESTION ONE (30 MARKS)

- (a) A 22 year old woman who works in a plant nursery presents with a history of fever and cough for 2 months. Over this period of time, she has lost 5 kg. Chest radiography shows bilateral upper lobe infiltrates with cavities. A stain of her sputum shows acid fast bacilli.
- (i) Name the disease and state the organism most likely to be responsible for the patient's disease. [2 marks]
- (ii) State the likely means by which the patient acquired her infection [1 mark]
- (iii) Describe the various prophylactic measures against the disease [4 marks]
- (b) Differentiate between the following important infectiological terms:
- (i) Relapses and Reinfection [2 marks]
- (ii) Endogenous infection and Exogenous infection [2 marks]
- (iii) Pathogenicity and Virulence [2 marks]
- (c) Define the term pathogenicity islands (PI) [1 mark]
- (d) Briefly describe the specific defense mechanisms against a bacterial and fungal infection [5 marks]

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- (e) Giving examples, highlight the clinical classification of mycoses [4 marks]
- (f) Giving examples, differentiate between exotoxins and endotoxins [4 marks]
- (g) Differentiate between Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) [3 marks]

QUESTION TWO (20 MARKS)

- (a) Using a well-labeled diagram, describe phagocytosis as a nonspecific defense mechanism [6 marks]
- (b) Briefly describe fungal allergies and fungal toxicoses as highlighted in medical mycology [4 marks]
- (c) Following an outbreak in Marsabit County in May, 2020, a 15 year old girl developed severe watery diarrhea. The stool looked like “rice water”. It was voluminous – more than 1 L in the last 90 minutes. She had no fever and seemed otherwise normal except for the effects of loss of fluid and electrolytes.
 - (i) Name the disease and state the causative organism for the patients disease [2 marks]
 - (ii) State the toxin produced by the organism given in (i) above and describe its mechanism of action that makes the organism more pathogenic [7 marks]
 - (iii) State the most important thing that can be done to treat the patient [1 mark]

QUESTION THREE (20 MARKS)

- (a) Using well labeled diagrams, differentiate between the cell wall of Gram-positive bacteria and Gram negative bacteria, and explain their medical significance [10 marks]
- (b) A limited number of anti-infective agents are available for specific treatment of fungal infections. Briefly discuss the most commonly used antifungal agents. [10 marks]

QUESTION FOUR (20 MARKS)

- (a) Describe the most important mechanisms in nonspecific defenses against bacterial or fungal infection. [10 marks]
 - (b) Describe the mechanisms (strategies) used by pathogenic bacteria to overcome the host’s nonspecific immune defenses discussed in (a) above [10 marks]
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