

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE  
(BIOMEDICAL SCIENCE AND TECHNOLOGY)**

**BIOC 451: DIAGNOSTIC MICROBIOLOGY AND PARASITOLOGY**

**STREAMS: BSC**

**TIME: 2 HOURS**

**DAY/DATE: THURSDAY 23/09/2021**

**11.30 A.M – 1.30 P.M.**

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**INSTRUCTIONS:**

- Answer question ONE (COMPULSORY) and any other TWO questions.
- Sketch diagrams may be used whenever they may help to illustrate your answer.
- Do not write anything on the question paper.
- This is a closed book exam. No reference materials are allowed in the examination room.
- There will be No use of mobile phones or any other unauthorized materials.
- Write your answers legibly and use your time wisely.

**QUESTION ONE (30 MARKS) COMPULSORY**

- (a) Briefly explain six (6) factors that precipitates diagnosis in a health system. (6 marks)
- (b) Discuss how causative agents responsible for both parasitic and microbial associated diseases can be determined in a diagnostic laboratory. (6 marks)
- (c) Discuss four (4) parameters used in the process of micro-organism identification in a diagnostic microbiology and parasitology laboratory. (6 marks)
- (d) Outline four (4) general factors that can lead to specimen rejection in a diagnostic microbiology and parasitology laboratory. (4 marks)
- (e) You are working in a diagnostic microbiology and parasitology laboratory as a technologist, a urine sample from a patient suspected to be suffering from urinary tract infection is brought to you.
- (i) Give two (2) pathogenic bacterial and one (1) parasites that can be isolated and identified from the sample. (3 marks)

- (ii) State the best media you can use to culture the above mentioned sampled and explain why? (2 marks)
- (iii) After culturing the urine sample, suppose that approximately 25 colonies of the identified pathogenic bacteria are identified in the culture plate after inoculating the sample in the plate medium using a 1/250 ml metallic loop. Calculate the number of colony forming unit (CFU) per ml of urine and give the clinical interpretation of the result. (3 marks)

**QUESTION TWO (20 MARKS)**

- (a) A patient presents to a health institution complaining of severe sweating at night, cough lasting more than two weeks and fatigue. The clinician suspected that she might be suffering from tuberculosis.
  - (i) What is the best sample to be collected from the patient for confirmatory diagnosis in a diagnostic microbiology and parasitology laboratory. (1 mark)
  - (ii) Which is the best medium that can be used to transport the above mentioned sample. (2 marks)
  - (iii) Including bacteria, fungi and parasites. Give four (4) pathogenic micro-organisms or parasites that can be isolated and identified from the above mentioned sample. (4 marks)
  - (iv) Explain the proper procedure that should be followed to detect acid fast bacteria from the sample. (7 marks)
  - (v) Give a detailed procedure to be followed to process the sample when *Aspergillus* infection is suspected. (4 marks)
  - (vi) State two (2) culture medium that can be used in the diagnostic microbiology and parasitology laboratory to inoculate the above mentioned sample. (2 marks)

**QUESTION THREE (20 MARKS)**

- (a) A cerebrospinal fluid (csf) collected from a patient in an intensive care unit (ICU) in a referral hospital is brought to the diagnostic microbiology and parasitology laboratory for analysis;
  - (i) State four pathogenic fungi, bacteria, parasites and viruses that can be isolated from cerebrospinal fluid in a diagnostic microbiology and parasitology laboratory. (4 marks)
  - (ii) Discuss macroscopic analysis and reporting of the cerebrospinal fluid sample in the laboratory. (4 marks)

- (iii) Give a well detailed procedure to be followed when counting cells in a cerebrospinal fluid (csf) sample. (8 marks)
- (iv) Explain the clinical interpretations of low cerebrospinal fluid (csf) glucose. (4 marks)

**QUESTION FOUR (20 MARKS)**

- (a) A patient present to a gastroenterologist physician complaining from abdominal pain the gastroenterologist ordered for a stool sample laboratory analysis in a diagnostic microbiology and parasitology section.
    - (i) State two (2) pathogenic bacteria and two (2) pathogenic parasites that may be isolated from the stool sample of the patient. (4 marks)
    - (ii) Give a clear procedure that can be used when examining stool sample microscopically. (7 marks)
    - (iii) Give a clear procedure that can be used to carry out motility test. (4 marks)
    - (iv) Give three (3) culture and two (2) biochemical tests that can be used in isolation and identification of the bacteria pathogens in a stool sample. (5 marks)
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