



"Investing in Africa's Future"

**COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES**

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE

**NSLS 404: MICROBIOLOGY II
END OF SEMESTER EXAMINATIONS**

MAY 2022

LECTURER: DR E. MUGOMERI

DURATION: 3 HOURS

INSTRUCTIONS

- Do NOT write your name on the answer sheet.
- Answer **all** questions.
- Begin your answer for each question on a new page.
- Credit is given for neat, well-written work.

1. Concerning *Escherichia coli* (*E. coli*) and *Staphylococcal* illnesses:
 - a. Targeting the interprofessional team of the hospital infection control committee, describe the importance of hospital infection control in preventing the spread of various illnesses caused by *E. coli* and *Staphylococcal aureus*. (10)
 - b. Targeting the same committee above, review the challenges the laboratory usually faces in conducting day-to-day appropriate laboratory diagnosis for *E. coli* infection. (10)
 - c. Outline specific antibiotics that should be made available for treating *E. coli* infections, write to the pharmacist explaining how the drugs work against *Staphylococcal* and explain your concerns about how drug resistance may occur against these drugs. (10)
 - d. Mentioning the key members of the committee above and their roles in the infection control committee, summarize the importance of collaboration amongst the committee members to prevent the spread of *E. coli* infection in the hospital. (10)
2. Clinical microbiology laboratories play a pivotal role in infection control programmes. They have the first opportunity to detect infectious diseases and should participate in the surveillance of these infections. Describe in detail the role of the laboratory in the following towards infection control;
 - a. Food-borne and water-borne diseases (10)
 - b. Vector-borne and zoonotic diseases (10)
 - c. New emerging pathogens (5)
3. An 18-year-old female patient presented to the emergency department (ED) complaining of severe headache, pain in her legs, nausea, vomiting, and fluid leaking from the site of a previous surgery on the central nervous system (CNS). Past history indicates that a central nervous system surgery was done approximately 6 weeks prior to visiting the ED. She had been seen in the ED twice in the past 2 weeks with migraine headaches and sinusitis. She underwent a spinal tap on both of these occasions and cerebrospinal fluid (CSF) cultures were done. The patient was taken for surgery, the previous CNS surgical incision was opened and a large amount of CSF that had pooled under the incision was collected. The CSF was submitted to the laboratory for Gram stain, cell count, glucose, total protein, culture and susceptibility testing. The patient was placed on vancomycin and cefotaxime therapy after the lab investigations.
 - a. Explain how you would process the CSF and what organisms you would most likely find and why. (15)

- b.** Describe the rationale for the drugs given to the patient and the mechanisms of action for these drugs. **(5)**
- c.** Describe the pathological mechanisms associated with 2 of the possible organisms involved. **(5)**

END