



**UNIVERSITY EXAMINATIONS**  
**FIRST YEAR EXAMINATION FOR THE AWARD OF THE**  
**DEGREE OF BACHELOR OF SCIENCE IN NURSING**  
**SECOND SEMESTER 2022/2023**  
**[JANUARY-APRIL, 2023]**

**NUR 121: MEDICAL MICROBIOLOGY**

**STREAM: Y1S2**

**TIME: 3 HOURS**

**DAY: WEDNESDAY, 9:00 – 12:00 PM**

**DATE: 05/04/2023**

---

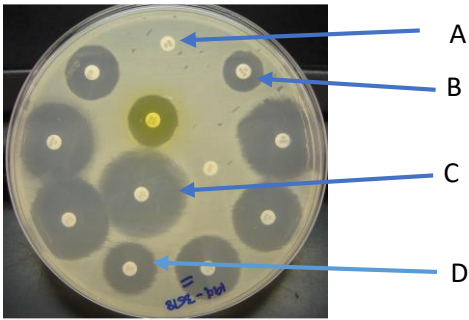
**INSTRUCTIONS**

- 1. Do not write anything on this question paper.**
- 2. Answer all questions in both sections A, B and C.**

**SECTION A: (20 MARKS)**

**Answer ALL questions from this Section**

- Which one of the following is an example of a bacterial differential stain
  - Acridine orange stain
  - Ziehl Nielsen stain
  - Calcofluor stain
  - Gram stain
- Which one of the following is a counter stain for Ziehl Neelsen staining
  - Carbol Fuschin
  - Crystal violet
  - Methylene blue
  - Neutral red
- Among the following bacterial biochemical tests which one breaks down hydrogen peroxide to water and oxygen producing bubbles
  - Catalase test
  - Coagulase test
  - Oxidase test
  - Urease test
- The following are the findings obtained from a disc diffusion test done using various antibiotics against *E. coli* obtained from urine sample obtained from a patient suffering from a UTI. Identify the antibiotic that could be recommended in management of this UTI.



5. Among the following *Clostridium* species which one is well matched with the condition it causes
  - A. Botulism- *C. tetani*
  - B. Tetanus - *C. difficile*
  - C. Gas gangrene- *C. perfringens*
  - D. Food poisoning – *C. botulinum*
6. Is a pathogenic bacteria causing inability to swallow, speech difficulty and paralysis:
  - a. *Shigella dysenteriae*
  - b. *Clostridium perfringens*
  - c. *Clostridium botulinum*
  - d. *Corynebacterium diphtheria*
7. Diarrhoea is not caused by:
  - a. *Shigella dysenteriae*
  - b. *Streptococcus pyogenes*
  - c. *Clostridium difficile*
  - d. *Salmonella enteritidis*
8. Which of the following microorganisms is not responsible for urinary tract infection?
  - a. *Proteus mirabilis*
  - b. *Escherichia coli*
  - c. *Klebsiella pneumonia*
  - d. *Bacteroides fragilis*
9. Prokaryotic cells are more resistant to osmotic shock than eukaryotic cells because
  - a. Their cell wall is composed of peptidoglycan
  - b. They are selectively permeable
  - c. They contain osmoregulating porins
  - d. They block water molecules from entering the cell
10. Which statement about ***Mycoplasma*** is incorrect?
  - a. Treatable with azithromycin and erythromycin antibiotics
  - b. Resistant to all antibiotics
  - c. lack cell wall
  - d. Small and intracellular bacteria

11. An outbreak of sepsis caused by *Staphylococcus aureus* has occurred in the newborn nursery. According to your knowledge of the normal flora, what is the most likely source of the organism?
  - a. Nose
  - b. Colon
  - c. Hand
  - d. Throat
12. Sterilization is done by autoclave consisting of exposure to steam above:
  - a. 120 °C
  - b. 170 °C
  - c. 121 °C
  - d. 116 °C
13. Patients with cystic fibrosis infection suffer from a chronic lung infection caused by *Pseudomonas aeruginosa*. The bacterial growth results in the formation of \_\_\_\_\_ in the host cells.
  - a. Pigment
  - b. Biofilm
  - c. cysts
  - d. Endotoxins
14. *Salmonella typhi* and *Salmonella paratyphi* are the two major pathogens that cause enteric fever. Which of the following are NOT possible specimens taken for the routine diagnosis of the disease?
  - a. Blood
  - b. Sputum
  - c. Faeces
  - d. Urine
15. The bloody dysentery epidemics have occurred in different parts of Africa. Identify the predominant pathogen associated with the dysentery outbreaks in Africa.
  - a. *Shigella sonnei*
  - b. *Shigella boydii*
  - c. *Shigella dysentery type III*
  - d. *Shigella dysentery type I*
16. The symptoms of typhoid fever usually develop in one to three weeks after exposure to *S. typhi*. Which of the following is the least common symptom of the disease?
  - a. Joint pains
  - b. High-grade fever
  - c. Weight gain
  - d. Headache

17. A 20-year-old man infected with syphilis developed a skin lesion on his prepuce, the lesion was oval in shape and painless. What is the specific name for this type of lesion?
- Nodules
  - Hard Chancre
  - Eczema
  - Papule
18. Which one of the following is NOT among the general characteristics of *Haemophilus ducreyi*?
- It is susceptible to erythromycin
  - Gram-negative coccobacillus
  - It grows well on standard chocolate media
  - It requires the X-Factor but not V-Factor
19. All of the following are the symptoms of pulmonary tuberculosis EXCEPT?
- Weakness and malaise
  - Weight loss
  - Decreased body temperature
  - Severe prolonged cough with sputum or blood
20. Vertical transmission of gonococcal infection to neonates can occur during the delivery through an infected mother. What is the most common type of infection seen in newborns?
- Meningitis
  - Liver infection
  - Mastitis
  - Ocular infection

**SECTION B: (40 marks)**

**Answer ALL questions from this section**

1. Describe the physical and chemical growth requirements of bacteria giving examples and the effects of each. (4marks)
2. a) Describe the advantages of using a wet-mount preparation to examine a specimen under the microscope. (2marks)  
b) Explain the methods used to fix a specimen for microscopic examination. (2marks)
3. a) Using a sketch diagram draw a well labelled structure of a bacterial endospore. (2marks)  
b) Explain the functions of plasmids in a bacterial cell. (2marks)
4. A Second year student inoculated *Salmonella typhi* in MacConkey agar and incubated for 72 hours. If at the end he counted 7200 colonies, what was the initial population of cells inoculated? Take the generation time of bacteria to be 18 hours. (4marks)
5. Complete the table below: (4marks)

<b>Bacterium</b>	<b>mode of transmission</b>	<b>Disease caused</b>
a. -----	-----	Chancroid
b. <i>Bordetella pertussis</i>	-----	-----
c. <i>Chlamydia trachomatis</i>	-----	-----
d. <i>Mycoplasma genitalium</i>	-----	-----

6. a) Explain briefly the qualities of a good antibiotic (2marks)  
b) Describe the mechanisms of antibiotics resistance by bacteria (2marks)
7. Identify the virulent factors of *Staphylococcus aureus* responsible for infections. (4marks)
8. A young female student is admitted with clinical manifestation of cellulitis, impetigo and throat infections. Laboratory investigations of a sample taken revealed gram positive spherical bacteria in chains. Explain diagnostic procedure carried out to determine the etiological agent, its treatment and control. (4marks)

9. *Neisseria gonorrhoeae* has developed resistance to conventional drugs in most parts of developing countries. Describe the clinical symptoms observed in patients with gonorrhoea and possible reasons why resistance is on the increase. (4 marks)
10. A Patient is brought to a medical facility where you are stationed with red maculopapular rashes on the skin. Preliminary investigation reveal *Treponema pallidum* infection. Describe the pathogenesis of this bacterial infection in the human body. (4 marks)

**SECTION C: ( 40 MARKS)**

**Answer ALL questions from this section**

1. You have been invited to a camp providing temporary shelter by people displaced by bandits in Northern Kenya to give a health talk on Cholera outbreak. Prepare an outline of your presentation detailing transmission, pathogenesis, diagnosis and management of this medical condition in that camp. (20 marks)
2. A HIV positive patient manifest severe chest pains and persistent cough. Preliminary investigation reveals ***Mycobacterium tuberculosis*** infection. Discuss in details the transmission, pathogenesis, diagnosis and treatment of this infection. (20 marks)