



KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN NURSING

FIRST SEMESTER, 2021/2022

(FEBRUARY - JUNE, 2022)

NURS 121: MEDICAL MICROBIOLOGY

STREAM: Y1 S1

TIME: 3 HOURS

DAY: TUESDAY, 9:00 – 12:00 P.M.

DATE: 17/05/2022

INSTRUCTIONS:

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

SECTION A: (20 MARKS)

Answer ALL questions from this Section

1. One of the following is a bacteria without the cell wall:
 - a) *Chlamydia*
 - b) *Mycoplasma*
 - c) *Vibrios*
 - d) *Helicobacter*
2. Is the causative agent of whooping cough
 - a) *Bordetella pertussis*
 - b) *Mycobacterium avium complex*
 - c) *Helicobacter pylori*
 - d) *Clostridium botulinum*
3. Is a strain of bacteria causing Brucellosis in humans:

- a. *Brucella bovis*
 - b. *Brucella abortus*
 - c. *Brucella melitensis*
 - d. *Brucella suis*
4. Necrotic effect of ***Corynebacterium diphtheriae*** in the respiratory system is caused by:
- a. Heat labile polypeptide exotoxins
 - b. Heat labile endotoxins
 - c. Corynebacterial enzymes
 - d. All of the above are correct
5. One of the following groups of antibiotics is not effective in treatment of **S. aureus**:
- a. Trimethoprim-sulfamethoxazole
 - b. Erythromycin, clarithromycin and azithromycin
 - c. Penicillin G, ampicillin and piperacillin
 - d. vancomycin
6. Is a spiral gram negative rod associated with duodenal ulcers in humans:
- a. *Clostridium perfringens*
 - b. *Haemophilus ducreyi*
 - c. *Streptococcus pyogenes*
 - d. *Helicobacter pylori*
7. Is a pathogenic bacteria causing inability to swallow, speech difficulty and paralysis:
- a. *Shigella dysenteriae*
 - b. *Clostridium perfringens*
 - c. *Clostridium botulinum*
 - d. *Corynebacterium diphtheriae*
8. Exhibit abdominal pains, fever, watery diarrhoea, stool with mucus and blood, dehydration, and acidosis during infection. The likely bacterium responsible for the infections is:
- a. *Shigella dysenteriae*

- b. *Salmonella typhoid*
 - c. *Escherichia coli*
 - d. *Klebsiella pneumoniae*
9. Is a bacterium limited to columnar epithelium in the cervix, urethra, rectum, pharynx, conjunctiva and squamous epithelium:
- a. *Neisseria gonorrhoeae*
 - b. *Neisseria meningitidis*
 - c. *Treponema pallidum*
 - d. *Haemophilus ducreyi*
10. The following are symptoms of ***Mycobacterium tuberculosis*** infection except:
- a. Chronic cough
 - b. Weight loss
 - c. Night sweats
 - d. Diarrhoea
11. Is a bacterium transmitted mainly through sexual intercourse:
- a. *Haemophilus ducreyi*
 - b. *Clostridium tetani*
 - c. *Salmonella typhi*
 - d. *Mycobacterium tuberculosis*
12. A 20-year-old college student with a history of urinary tract infections comes to the emergency department with burning on urination along with frequency and urgency. She says her urine smells like ammonia. The cause of her urinary tract infection is likely to be:
- a. *Salmonella typhi*
 - b. *Proteus mirabilis*
 - c. *Citrobacter freundii*
 - d. *Escherichia coli*
13. Which of the following organisms principally infects the liver and kidneys?
- a) *Leptospira interrogans*

- b) *Staphylococcus aureus*
 - c) *Escherichia coli*
 - d) *Treponema pallidum*
14. Is a bacteria that is mostly nosocomial:
- a) *Haemophilus ducreyi*
 - b) *Pseudomonas aeruginosa*
 - c) *Proteus mirabilis*
 - d) *Helicobacter pylori*
15. One of the following is not a characteristic of Gram positive bacteria?
- a) Many layers of peptidoglycan in the cell wall
 - b) Large quantity of lipopolysaccharides in the cell wall
 - c) Little amount of lipids present in the cell wall
 - d) Presence of teichoic acids in the cell wall
16. Which statement about ***Proteus species*** is correct?
- a) Transmitted through contact
 - b) toxigenic
 - c) swarms on agar media
 - d) Nosocomial
17. Which one of the following bacterial structures is identified by negative staining technique?
- a) Flagellum
 - b) Endospore
 - c) Capsule
 - d) All of the above
18. Identify the appropriate treatment for an infant infected with *Vibrio cholerae*:
- a) Water and electrolyte replacement with oral tetracycline
 - b) Infusion of Erythromycin and penicillin
 - c) Oral tetracycline only
 - d) Isoniazid and streptomycin
19. Plasmids enable bacteria to perform the following except:

- a) Resist antibiotics
 - b) Tolerate heavy metals
 - c) Inhibit toxins production
 - d) Synthesize invasive enzymes
20. Which statement about ***Chlamydiae*** is incorrect?
- a) Treatable with azithromycin and erythromycin antibiotics
 - b) Resistant to all antibiotics
 - c) Causes trachoma disease in humans
 - d) Small and intracellular bacteria

SECTION B : (40 marks)

Answer ALL questions from this section

1. Distinguish between bacterial and fungal cells using their structural characteristics [4 marks]
2. Explain with a structural sketch diagram the adaptations of a bacterial flagellum [5 marks]
3. Bacterial growth on artificial media requires a number of factors. Briefly enumerate the necessary factors that must be present for growth to occur [5 marks]
4. Describe hanging-drop technique and outline its advantages in microscopy [5marks]
5. Outline the procedure of Gram staining used in classification of bacteria [5 marks]
6. ***Bacillus anthracis*** causes severe infections especially among immunocompromised patients. Describe clinical symptoms associated with this bacterium. [5 marks]

7. As a health professional you have been invited to give a health talk on **tuberculosis** infection in a village. Explain the contents of your talk on transmission, symptoms, prevention and control of this bacterial infection to the audience. [5 marks]
8. Complete the table below. [5 marks]

| Disease | causative agent |
|--------------------------|------------------------|
| a. <i>Typhoid</i> | _____ |
| b. <i>Cholera</i> | _____ |
| c. <i>Syphillis</i> | _____ |
| d. <i>Tetanus</i> | _____ |
| e. <i>Whooping Cough</i> | _____ |

SECTION C: (40 MARKS)

Answer ALL questions from this section

1. a) A second year nursing student inoculated *Staphylococcus aureus* in a gar media for 48 hours. Given that the generation time for the bacteria is 24 hours, calculate the total number of cells inoculated if at the end the student counted approximately 1200 colonies [5 marks]
- b) With the aid of a normal growth curve discuss the phases of growth of the bacteria on agar media [15marks]
2. A patient manifests dysuria, lesions on the genitalia, proctitis and rashes on the skin upon examination. Preliminary investigation reveals **Treponema pallidum** infection. Discuss in details the transmission, symptoms, diagnosis and treatment of this infection. [20 marks]