



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

JANUARY – APRIL 2022

SCHOOL OF NURSING

REGULAR PROGRAMME

NUR 207: MEDICAL MICROBIOLOGY

Date: APRIL 2022

Duration: 3 Hours

INSTRUCTIONS: ANSWER ALL QUESTIONS IN THE BOOKLET PROVIDED

SECTION A: MULTIPLE CHOICE QUESTIONS

(20 MARKS)

1. Bacteria that cause nosocomial infections often produce extracellular substances that allow them to stick firmly to medical devices such as intravenous catheters. What is the name of this substance?
 - A. Endotoxin
 - B. Glycocalyx
 - C. Porin
 - D. Flagella
2. Which of the following chemicals is used to sterilize heat sensitive surgical instruments?
 - A. Benzalkonium chloride
 - B. Formaldehyde
 - C. Hypochlorite solution
 - D. Ethylene oxide

3. The laboratory technician concludes that a patient has *Staphylococcus aureus* bacteria. Which one of the following sets of results did the technician find with the organism recovered from the blood culture? Gram-positive cocci in
- A. chains, catalase positive, coagulase positive
 - B. chains, catalase negative, coagulase negative
 - C. clusters, catalase positive, coagulase negative
 - D. clusters, catalase negative, coagulase positive
4. Which of the following is a large gram-positive rod that causes necrosis of tissue by producing an exotoxin that degrades lecithin, leading to lysis of cell membranes?
- A. *Bacillus anthracis*
 - B. *Bacillus cereus*
 - C. *Clostridium perfringens*
 - D. *Corynebacterium diphtheria*
5. A two-week-old boy is admitted in the intensive care unit with fever and signs of meningitis. Gram stain of the spinal fluid reveals small gram-positive rods. Colonies on blood agar show a narrow zone of β -hemolysis. Which is the most likely cause of the neonatal meningitis?
- A. *Bacillus anthracis*
 - B. *Neisseria meningitidis*
 - C. *Clostridium perfringens*
 - D. *Listeria monocytogenes*
6. A 30-year-old man who works in a slaughter house has a 2-cm lesion on his arm. The lesion began as a painless papule that enlarged and within a few days ulcerated and formed a black crust. A Gram stain of fluid from the lesion reveals large gram-positive rods. Which is the most likely bacteria?
- A. *Bacillus anthracis*
 - B. *Clostridium botulinum*
 - C. *Clostridium perfringens*
 - D. *Clostridium tetani*

7. A patient has third-degree burns over most of his body. He was doing well until two days ago he developed fever and his dressing revealed pus that had a blue-green color. Gram stain of the pus revealed a gram-negative rod that formed colorless colonies on Eosin Methylene Blue agar. Which of the following bacteria is the most likely cause of the infection?
- A. *Campylobacter jejuni*
 - B. *Escherichia coli*
 - C. *Haemophilus influenza*
 - D. *Pseudomonas aeruginosa*
8. Regarding members of the family Enterobacteriaceae, which of the following is most accurate? All the members of the family
- A. are anaerobic
 - B. ferment lactose
 - C. have an endotoxin
 - D. produce an enterotoxin
9. What is the most important pathogenic component shared by *Streptococcus pneumoniae*, *Neisseria meningitidis* and *Haemophilus influenzae*?
- A. Protein A
 - B. Capsule
 - C. Endotoxin
 - D. β -lactamase
10. Mr. X had a deep wound which had started changing colour to show flourishing green pigment. The wound is most likely infected with:
- A. *Salmonella typhi*
 - B. *Staphylococcus epidermidis*
 - C. *Pseudomonas aeruginosa*
 - D. *Pseudomonas putida*

11. Regarding varicella-zoster virus (VZV), which of the following is most accurate?
- A. High-dose acyclovir can eliminate the latent state caused by VZV
 - B. When VZV infection occurs in immunocompromised patient acyclovir should be given to prevent disseminated infection
 - C. The principal site of latency of VZV is the nucleus of motor neurons
 - D. VZV is transmitted by dog-bite
12. Regarding measles virus and the disease measles, which one of the following statements is most accurate?
- A. The measles vaccine contains the killed virus as the immunogen
 - B. One of the main sequelae of measles is autoimmune glomerulonephritis and kidney failure
 - C. Fecal-oral transmission during the diaper stage is the main mode of acquisition of measles virus
 - D. The virus has only one antigenic type and lifelong immunity occurs when one gets infected
13. An outbreak of jaundice occurs in several children who attend the same day care center. If the outbreak was caused by a virus, which of the following is the most likely cause?
- A. Hepatitis A
 - B. Hepatitis B
 - C. Hepatitis C
 - D. Hepatitis D
14. The correct statement regarding mumps is:
- A. Mumps virus is a Orthomyxovirus hence double stranded RNA genome
 - B. Hepatitis is a recognized complication of mumps
 - C. Mumps orchitis in children before puberty attaches the ovaries
 - D. During mumps the virus spread through bloodstream to various internal organs

15. The correct statement about human immunodeficiency virus (HIV) is:
- A. Screening tests for antibodies are useful to prevent transmission of HIV through blood transfusion
 - B. The opportunistic infections seen in AIDS are primarily due to loss of humoral-mediated immunity
 - C. Zidovudine inhibits the protease inhibitors
 - D. The presence of circulating antibodies that neutralize HIV is evidence that one is protected against HIV-induced disease
16. Which of the following statements is correct about poliovirus?
- A. Congenital infection of the fetus is an important complication
 - B. The virus replicates extensively within the gastrointestinal tract
 - C. A skin test is used to determine prior exposure
 - D. Amantadine is an effective preventive drug
17. Regarding human papilloma virus (HPV) which is the most accurate?
- A. There is no vaccine available against HPV
 - B. Acyclovir is effective in preventing lesions caused by HPV but does not cure the latent state
 - C. Antigen-antibody complexes play an important role in the pathogenesis of warts caused by HPV
 - D. The early proteins of HPV play a more important role in malignant transformation than the late proteins
18. Which of the following fungi is most likely to be found within reticuloendothelial cells?
- A. *Histoplasma capsulatum*
 - B. *Candida albicans*
 - C. *Cryptococcus neoformans*
 - D. *Sporothrix schenckii*

19. Infection by a dermatophyte is most often associated with
- A. Intravenous drug abuse
 - B. Inhalation of organism from contaminated bird droppings
 - C. Adherence of organism to perspiration-moist skin
 - D. Fecal oral transmission
20. Aspergillosis is recognized in tissue by the presence of:
- A. Budding cells
 - B. Septate hyphae
 - C. Metachromatic granules
 - D. Pseudohyphae

PART-II: SHORT ANSWER QUESTIONS (SAQs)

(40 MARKS):

1. Describe beneficial effects of normal flora. **(5 marks)**
2. Describe the pathogenesis of the cholera toxin. **(4 marks)**
3. Explain the three (3) clinical manifestations of *Mycobacteria tuberculosis* **(5 marks)**
4. Describe the viral growth cycle of the human immunodeficiency virus (HIV). **(5 marks)**
5. Describe the biology and pathogenesis of influenza viruses **(5 marks)**
6. State five (5) virulent factors of *Streptococcus pyogenes* **(5 marks)**
7. Describe the pathogenesis of human papilloma virus (HPV) infection **(6 marks)**

8. Describe the disease caused by the fungi *Candida albicans* (5 marks)

PART III: LONG ANSWER QUESTIONS (LAQs) (40 MARKS)

1. Pyogenic meningitis is a common cause of childhood morbidity and mortality in developing countries.
- a) Describe the morphology and staining properties of the three (3) leading causes of bacterial meningitis (6 marks)
 - b) For one of the bacteria described in (a) above, describe the pathogenesis and virulent factors (11 marks)
 - c) For each of the bacteria described in (a) above, indicate the antibiotic(s) of choice in its management (3 marks)
2. Covid-19 is worldwide pandemic that has caused a lot of panic and suffering.
- a) Describe the biology of this virus and clinical manifestation (8 marks)
 - b) Explain its prevention mechanisms, using the current vaccines available and the body's immune system (12 marks)

END