

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**SECOND YEAR EXAMINATION FOR THE AWARD OF  
BACHELOR OF SCIENCE IN NURSING**

**NURS 223: MEDICAL MICROBIOLOGY**

**STREAMS: B.SC (NURS)**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 15/12/2014**

**2.30 P.M. – 4.30 P.M.**

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**INSTRUCTIONS:**

- **The paper has three sections.**
- **All questions in section I and II are compulsory**
- **Answer only ONE (1) question in section III**

**PART I: MCQS [20 MARKS]**

Each question below contains four (4) suggested responses. Please choose the **one best** response to each question.

1. The severity of a patient's illness depends on all the following **EXCEPT**
  - a) Incubation period
  - b) Extent of infection
  - c) Susceptibility of the host
  - d) Pathogenicity of the microorganism
2. A nurse develops clinical symptoms consistent with hepatitis. She recalls sticking herself with a needle approximately 4 months before after drawing blood from a patient. Serologic tests for HBsAg, Antibodies to HBsAg, and Hepatitis A Virus (HAV) are all negative; however, she is positive for IgM core antibody. The nurse
  - a) Does not have hepatitis B
  - b) Has hepatitis A
  - c) Is in the late stages of hepatitis B infection
  - d) Is in the "window" period (after the disappearance of HBsAg and before the appearance of anti-HBsAg)
3. *C. trachomatis* can be distinguished from *C. psittaci* by which of the following criteria?
  - a) *C. trachomatis* is sensitive to sulfonamides

- b) *C. trachomatis* has a different lipopolysaccharide antigen
  - c) *C. trachomatis* can be stained with Giemsa
  - d) *C. psittaci* is an obligate prokaryotic parasite
4. An immunocompromised person with history of seizures had an magnetic resonance imaging (MRI) that revealed a temporal lobe lesion. Brain biopsy results showed multinucleated giant cells with intranuclear inclusions. The most probable cause of the lesion is
- a) Hepatitis C virus
  - b) Herpes simplex virus
  - c) Coxsackievirus
  - d) Parvovirus
5. Human papillomavirus is most commonly associated with
- a) Carcinoma of the lung
  - b) Prostate cancer
  - c) Condyloma acuminatum
  - d) Hepatic carcinoma
6. Orchitis, which may cause sterility, is a possible manifestation of which of the following?
- a) Mumps
  - b) Rhinovirus
  - c) Cytomegalovirus
  - d) Respiratory syncytial virus
7. An inhibitor was designed to block a biologic function in *H. influenza*. If the goal of the experiment was to reduce the virulence of *H. influenza*, the most likely target would be?
- a) Exotoxin liberator
  - b) Endotoxin assembly
  - c) Flagella synthesis
  - d) Capsule formation
8. Pathogenic mechanisms involved in tuberculosis can be primarily attributed to which of the following?
- a) Toxin production by the mycobacteria
  - b) Specific cell adhesion sites
  - c) Cell-mediated hypersensitivity
  - d) Humoral immunity
9. A sputum sample was brought to the laboratory for analysis. Gram stain revealed the following: rare epithelial cells, 8 to 10 polymorphonuclear leukocytes per high-power field, and pleomorphic Gram-negative rods. As the laboratory consultant, which of the following interpretations should you make?
- a) The sputum specimen is too contaminated by saliva to be useful
  - b) There is no evidence of an inflammatory response
  - c) The patient has pneumococcal pneumonia

- d) The appearance of the sputum is suggestive of *Haemophilus pneumonia*
10. Virtually all prokaryotic cells (bacteria, both Gram-positive and Gram-negative) contain peptidoglycan as well as specific enzymes for its synthesis. All of the following statements concerning gram-positive and gram-negative bacteria are true EXCEPT
- The extent of cross-linking of peptidoglycan is a function of different species of bacteria
  - The peptidoglycan-synthesizing enzymes can be antibiotic targets
  - Both Gram-positive and Gram-negative bacteria contain significant amounts of teichoic acid
  - With the exception of the structures that are cross-linked, peptidoglycan structure is common to most bacteria
11. A 30-year-old male patient was seen by the emergency service and reported a 2-week history of a penile ulcer. He noted that this ulcer did not hurt. Which one of the following conclusions/actions is most valid?
- Draw blood for a herpes antibody test
  - Perform a dark-field examination of the lesion
  - Prescribe acyclovir for primary genital herpes
  - Even if treated, the lesion will remain for months
12. A 55-year-old man who is being treated for adenocarcinoma of the lung is admitted to a hospital because of a temperature of 38.9°C(102°F), chest pain, and a dry cough. Sputum is collected. Gram's stain of the sputum is unremarkable and culture reveals many small Gram-negative rods able to grow only on a charcoal yeast extract agar. This organism most likely is
- Klebsiella pneumoniae*
  - Mycoplasma pneumoniae*
  - Legionella pneumophila*
  - Chlamydia trachomatis*
13. A patient was hospitalized after an automobile accident. The wounds became infected and the patient was treated with tobramycin, carbenicillin, and clindamycin. Five days after antibiotic therapy was initiated, the patient developed severe diarrhea and pseudomembranous enterocolitis. Antibiotic-associated diarrhea and the more serious pseudomembranous enterocolitis can be caused by
- Clostridium sordellii*
  - Clostridium perfringens*
  - Clostridium difficile*
  - Pseudomonas pseudomallei*
14. A patient complained to his dentist about a draining lesion in his mouth. A Gram's stain of the pus showed a few Gram-positive cocci, leukocytes, and many branched gram-positive rods. The most likely cause of the disease is
- Actinomyces israelii*
  - Actinomyces viscosus*

- c) *C. diphtheria*
  - d) *Propionibacterium acnes*
15. A hyperemic edema of the larynx and epiglottis that rapidly leads to respiratory obstruction in young children is most likely to be caused by
- a) *K. pneumoniae*
  - b) *M. pneumoniae*
  - c) *N. meningitidis*
  - d) *H. influenza*
16. Diphtheria toxin is produced only by those strains of *C. diphtheria* that are
- a) Glucose fermenters
  - b) Sucrose fermenters
  - c) Lysogenic for  $\beta$ -prophage
  - d) Of the mitis strain
17. Methicillin-resistant *S. aureus* (MRSA) was isolated from 7 patients in a 14-bed intensive care unit. All patients were isolated and the unit closed to any more admissions. Which one of the following reasons best explains these rigorous methods to control MRSA?
- a) MRSA is inherently more virulent than other staphylococci
  - b) The alternative for treatment of MRSA is vancomycin, an expensive and potentially toxic antibiotic
  - c) MRSA causes toxic shock syndrome
  - d) MRSA spreads more rapidly from patient to patient than antibiotic-susceptible staphylococci do
18. Mycoplasmas differ from chlamydiae in that they are
- a) Susceptible to penicillin
  - b) Able to grow on artificial cell-free media
  - c) Able to cause urinary tract infection
  - d) Able to stain well with Gram's stain
19. Rickettsiae, which include the spotted fevers, Q fever, typhus, and scrub typhus, are
- a) Obligate intracellular parasites
  - b) Stable outside the host cell
  - c) Easily stained (Gram-negative) with a Gram stain
  - d) Maintained in nature with humans as the mammalian reservoir
20. The formation of granulomas is seen in major systematic fungal infections. Which of the following groups of fungi is most likely to cause granulomas?
- a) *Aspergillus*, *Coccidioides*, *Cryptococcus*
  - b) *Mucor*, *Candida*, *Malassezia*
  - c) *Cladosporium*, *Aspergillus*, *Microsporium*
  - d) *Coccidioides*, *Blastomyces*, *Histoplasma*

**PART II: SHORT ANSWER QUESTIONS [30 MARKS] ANSWER ALL QUESTIONS**

1. Describe the use of Triple Sugar Iron (TSI) in the identification of Gram negative bacilli of medical importance [10 marks]
2. Describe FIVE (5) general characteristics of bacteria [10 marks]
3. Describe Viral growth cycle [5 marks]
4. Describe the Pathogenesis of *Mycobacterium tuberculosis* [5 marks]

**PART III: ESSAY QUESTIONS [20 MARKS] ANSWER ANY ONE (1) QUESTION ONLY**

1. There are four fungi causing opportunistic infections. Explain the diseases caused by each [20 marks]
  2. Write about the pathogenesis, laboratory diagnosis and clinical staging of Human Immunodeficiency Virus (HIV) infection [20 marks]
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