



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

**THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(NURSING)**

HNS 222: MEDICAL MICROBIOLOGY

DATE: APRIL 6, 2018

TIME: 8:30 – 11:30 AM

INSTRUCTIONS:

Answer:

All MCQs in Section A;

All Short-answer Questions in Section B

All Long-answer Questions in Section C

Cancelled work should be done neatly by crossing with a single line in the essay and by use of X in the MCQs

SECTION A: MULTIPLE CHOICE QUESTIONS (TOTAL: 20 MARKS)

1. The bacterial cells are at their metabolic peak during:
 - A) Lag phase
 - B) Log phase
 - C) Stationary phase
 - D) Decline phase

2. Endotoxin produced by gram-negative bacteria present in:
 - A) Peptidoglycan
 - B) Lipopolysaccharide
 - C) Teichoic acid
 - D) Inner membrane

3. Reverse transcriptase is an enzyme involved in the synthesis of:
- A) DNA
 - B) Soluble RNA
 - C) m-RNA from DNA
 - D) Nucleotides
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4. Several fungi are associated with disease in immunocompromised patients. Which one of the following is the LEAST frequently associated?
- A) *Aspergillus fumigatus*
 - B) *Cryptococcus neoformans*
 - C) *Malassezia furfur*
 - D) *Mucor* species
5. Serological reactions are useful for
- A) Detection of antigens
 - B) Detection of antibodies
 - C) Both a and b
 - D) None of these
6. You have made a clinical diagnosis of meningitis in a 50-year-old immunocompromised woman. A latex agglutination test on the spinal fluid for capsular polysaccharide antigen is positive. Of the following organisms, which one is the MOST likely cause?
- A) *Histoplasma capsulatum*
 - B) *Aspergillus fumigatus*
 - C) *Candida albicans*
 - D) *Cryptococcus neoformans*
7. The nucleus controls protein synthesis in the cytoplasm by sending:
- A) Chromatin
 - B) DNA template
 - C) mRNA molecule
 - D) Specialized protein
8. Chemical that are used for removal of microorganisms from mucous membrane and skin are known as:
- A) Detergents
 - B) Alcohol
 - C) Pesticides
 - D) Antiseptics

9. Fungal cells that reproduce by budding are seen in the infected tissues of patients with:
- A) Tinea corporis, tinea pedis, and tinea versicolor
 - B) Sporotrichosis, mycetoma, and aspergillosis
 - C) Mycetoma, candidiasis, and mucormycosis
 - D) Candidiasis, cryptococcosis, and sporotrichosis
10. The difference between Gram positive and Gram negative bacteria is shown to reside in:
- A) Cell wall
 - B) Nucleus
 - C) Cell membrane
 - D) Mesosomes
11. Staphylococcus aureus are characterized by:
- A) Formation of acid in sucrose, dextrose
 - B) Liquification of gelatin due to production of gelatinase
 - C) Strains are catalase positive
 - D) All of the above
12. Treponema pallidum can be best identified using:
- A) Fluorescence microscope
 - B) Bright field microscope
 - C) Dark field microscope
 - D) Gram staining
13. Enzymatic activity of enzyme dihydrofolate reductase is stopped by action of drug, known as
- A) Dihydropteroate synthetase
 - B) Transferase
 - C) Trimethoprim
 - D) Flucytosine
14. Which of the following is not an RNA virus?
- A) Retrovirus
 - B) Enterovirus
 - C) Rhabdovirus
 - D) Adenovirus
15. Innate immunity is developed by
- A) Mechanical barriers
 - B) Chemical barriers
 - C) Both a and b
 - D) None of these

16. Your patient is a woman with a vaginal discharge. You suspect, on clinical grounds, that it may be due to *Candida albicans*. Which one of the following statements is LEAST accurate or appropriate?
- A) A Gram stain of the discharge should reveal budding yeasts.
 - B) The clinical laboratory can use germ tube formation to identify the isolate as *C. albicans*.
 - C) Antibiotics predispose to *Candida* vaginitis by killing the normal flora lactobacilli that keep the vaginal pH low.
 - D) Culture of the discharge on Sabouraud's agar should produce a white mycelium with aerial conidia
17. A structural component that is found in all viruses is:
- A) The envelope
 - B) DNA
 - C) Capsid
 - D) RNA
18. Sterilization is done by autoclave that consist of exposure to steam at about
- A) 120°C
 - B) 170°C
 - C) 121°C
 - D) 116°C
19. Duration during which a specific antibody develops and becomes detectable in blood is known as
- A) Serology
 - B) Blood culture
 - C) Seroconversion
 - D) Antibody production
20. Penicillin, a drug that destroy cells only when they are in growing stage, is described as:
- A) Bacteriocins
 - B) Bactericidal
 - C) Bacteriostatic
 - D) Bacteria inhibiting

SECTION B: SHORT ANSWER QUESTIONS (40 MARKS)

1. State any two (2) functions of each of the following bacterial cell wall components:
 - a) Peptidoglycan (2 marks)
 - b) Cytoplasmic membrane (2 marks)
2. Briefly describe any two factors that determine bacterial pathogenicity (6 marks)
3. Describe the modes of transmission of hepatitis B virus (6 marks)
4. State the five (5) general steps during diagnosis of a bacterial infection (5 marks)
5. State the four (4) major mechanisms that mediate bacterial resistance to antimicrobial therapy (4 marks)
6. Antibacterial drugs have no effect on fungal diseases. Explain how antifungal drugs work to eradicate fungal diseases (4 marks)
7. Briefly describe how the following organs protect the human body against invasion by potential microorganisms:
 - a) Gastrointestinal tract (3 marks)
 - b) Respiratory tract (3 marks)
8. Describe the medical management of mucocutaneous candidiasis (5 marks)

SECTION C: LONG ANSWER QUESTIONS (40 MARKS)

1. Describe Streptococcal infections under the following subheadings:
 - a) Clinical presentation and management of most common infections caused by the following Streptococci:
 - i) *S. pyogenes* (10 marks)
 - ii) Viridans streptococci (6 marks)
 - b) Prevention of Streptococcal infections (4 marks)
2. Describe the human immunodeficiency virus infection under the following subheadings:
 - a) Clinical findings (3 marks)
 - b) Laboratory diagnosis (3 marks)
 - c) Treatment (10 marks)
 - d) Prevention (4 marks)

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