(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

THIRD YEAR, FIRST SEMESTER EXAMINATIONS
FOR THE DEGREE
OF
BACHELOR OF MEDICAL LABORATORY SCIENCE
(DIRECT & WEEKEND PROGRAMME)
(SPECIAL/SUPPLIMENTARY)

COURSE CODE: BML 212

COURSE TITLE: INTRODUCTION TO MEDICAL MICROBIOLOGY

DATE: **TIME:**

INSTRUCTIONS TO CANDIDATES

Instructions to Candidates
Answer All Questions

Section A: Multiple Choice Questions (MCQ)	20 Marks.
Section B: Short Answer Questions (SAQ)	40 Marks.
Section C: Long Answer Question (LAQ)	60 Marks

TIME: 2Hours

MMUST observes ZERO tolerance to examination cheating

Section A: Multiple Choice Questions (MCQ) **20 Marks**

1. Which one of the following is not a protist?
    (A) Bacteria
    (B) Algae
    (C) Fungi
    (D) Slime molds
2. Which one of the following agents simultaneously contains both DNA and RNA?
    (A) Bacteria
    (B) Viruses
    (C) Viroids
    (D) Prions
3. Which of the following are prokaryotes?
    (A) Archaebacteria
    (B) Protozoa
    (C) Viruses
    (D) Prions
4. *Mycoplasma* species lack which of the following components?
    (A) Ribosomes
    (B) Plasma membrane
    (C) Both DNA and RNA
    (D) Peptidoglycan
5. Eubacteria that lack cell walls and do not synthesize the precursors of peptidoglycan are called
    (A) Gram-negative bacteria
    (B) Viruses
    (C) Mycoplasmas
    (D) Bacilli
6. Archaebacteria can be distinguished from eubacteria by their lack of
    (A) DNA
    (B) Ribosomes
    (C) Peptidoglycan
    (D) Nucleus
7. The growth rate of bacteria during the maximum stationary phase of growth is
    (A) Zero
    (B) Increasing
    (C) Constant
    (D) Decreasing
8. Which of the following terms best describes a microorganism that grows at 20-40^{O}C?
    (A) Neutrophile
    (B) Psychrophile
    (C) Mesophile
    (D) Osmophile
9. Bacteria that are obligate intracellular pathogens of humans (eg, *Chlamydia trachomatis*) are considered to be
    (A) Autotrophs

(B) Photosynthetic
(C) Chemolithotrophs
(D) Heterotrophs

10. Which statement regarding fungal growth and morphology is correct?
    (A) Pseudohyphae are produced by all yeasts.
    (B) Molds produce hyphae that may or may not be partitioned with cross-walls or septa.
    (C) Conidia are produced by sexual reproduction.
    (D) Most yeasts reproduce by budding and lack cell walls.
11. Which statement regarding fungal cell walls is correct?
    (A) The major components of fungal cell walls are proteins such as chitin, glucans, and mannans.
    (B) The cell wall is not essential for fungal viability or survival.
    (C) Ligands associated with the cell walls of certain fungi mediate attachment to host cells.
    (D) Fungal cell wall components are the targets for the major classes of antifungal antibiotics, such as the polyenes and azoles.
12. A 54-year-old man developed a slowly worsening headache followed by gradual, progressive weakness in his right arm. A brain scan revealed a left cerebral lesion. At surgery an abscess surrounded by granulomatous material was found. Sections of the tissue and subsequent culture showed darkly pigmented septate hyphae indicating phaeohyphomycosis. This infection may be caused by species of which genus below?
    (A) *Aspergillus*
    (B) *Cladophialophora*
    (C) *Coccidioides*
    (D) *Malassezia*
13. Which statement regarding dermatophytosis is correct?
    (A) Chronic infections are associated with zoophilic dermatophytes, such as *Microsporum canis*.
    (B) Acute infections are associated with zoophilic dermatophytes, such as *M canis*.
    (C) Chronic infections are associated with anthropophilic dermatophytes, such as *M canis*.
    (D) Acute infections are associated with anthropophilic dermatophytes, such as *M canis*.
14. Which statement about phaeohyphomycosis is correct?
    (A) The infection only occurs in immunocompetent patients.
    (B) Infected tissue reveals branching, septate nonpigmented hyphae.
    (C) The causative agents are members of the normal microbial flora and can be isolated readily from the skin and mucosa of healthy persons
    (D) Phaeohyphomycosis may exhibit several clinical manifestations, including subcutaneous or systemic disease, as well as sinusitis.
15. Which statement about blastomycosis is correct?
    (A) Similar to other endemic mycoses, this infection occurs equally in men and women.
    (B) Infection starts in the skin, and the organisms commonly disseminate to the lungs, bone, genitourinary tract, or other sites.

(C) The disease is endemic to certain areas of South America.

(D) In tissue, one finds large, thick-walled, single budding yeast cells with broad connections between the parent yeast and bud.

16. Which one of the following is not a gram positive bacterium
    A) Yersinia
    B) Streptococcus
    C) Staphylococcus
    D) clostridium
17. Some viruses are characterized by helical symmetry of the viral nucleocapsid. Which of the following statements about viruses with helical symmetry is most accurate?
    (A) All enveloped viruses with helical symmetry are classified into the same virus family.
    (B) Helical nucleocapsids are found primarily in DNAcontaining viruses.
    (C) All human viruses with helical nucleocapsids possess an envelope.
    (D) Excess empty helical particles containing no nucleic acid are commonly produced in infected cells.
18. Which one of the following states a principle regarding viral nucleic acid?
    (A) Viruses contain both RNA and DNA.
    (B) Some viruses contain a segmented genome.
    (C) Purified viral nucleic acid from any virus is usually infectious.
    (D) Viral genome sizes are similar among known human viruses.
19. Which statement regarding aspergillosis is correct?
    (A) Patients with allergic bronchopulmonary aspergillosis rarely have eosinophilia.
    (B) Patients receiving parenteral corticosteroids are not at risk for invasive aspergillosis.
    (C) The diagnosis of pulmonary aspergillosis is frequently established by culturing *Aspergillus* from the sputum and blood.
    (D) The clinical manifestations of aspergillosis include local infections of the ear, cornea, nails, and sinuses.
20. Viruses usually initiate infection by first interacting with receptors on the surface of cells. Which of the following statements is most accurate about cellular receptors for viruses?
    (A) Cellular receptors for viruses have no known cellular function.
    (B) All viruses within a given family use the same cellular receptor.
    (C) All cells in a susceptible host express the viral receptor.
    (D) Successful infection of a cell by a virus may involve interaction with more than one type of receptor.

Section B: Short Answer Questions (SAQ) 40 Marks.

1. Highlight on the contributions made by the following scientist in the history of microbiology (4marks)
    A) Anton Van Leeuwenhoek (1632-1723)
    B) Edward Jenner (1749 - 1823).
    C) Lina Hesse (1881)
    D) Louis Pasteur (1822-1895)
2. State the 4 major contributions of Louis Pasteur in 1860s (4marks)
3. Give four applications of medical microbiology in disease treatment and control (4marks)
4. Define flagella and give ways in which their presence in bacterial cell can be detected (4marks)
5. Give the gram reaction / appearance of the following bacterial species (4marks)
    A) *Neisseria. meningitides*
    B) *Streptococcus. pyogenes*
    C) *Clostridium. Perfringens*
    D) *Brucella. abortus P. aeruginosa Escherichia coli*
6. A large number of biochemical tests are available which help in identifying the bacteria. Highlight on 4 groups in which these tests can be classified and give an example of a test under each group (4marks)
7. Microbiological Media is classified into five classes depending entirely on the ingredients the media contains and what types of micro-organisms are capable of growing in it. Give 4 classes of media (4marks)
8. Explain the following terms in regard to Bacterial pathogenesis (4marks)
    i. Adherence
    ii. Opportunistic pathogen
    iii. Virulence
    iv. Toxigenicity
9. Define the following terms (4marks)
    i. Decontamination
    ii. Disinfection
    iii. Sterilization
    iv. Biostat
10. State the mechanism of microbial inactivation by dry heat and state time – temperature relationship in Hot Air ovens (4marks)

Section C: Long Answer Question (LAQ) 60 Marks

1. Discuss the safety precautions taken while working in a medical microbiology laboratory (20 marks)
2. Discuss sterilization by autoclaving procedure. Explain the Mechanisms of microbial inactivation, drawbacks and cautions to be observed (20marks)
3. Outline the difference between innate and specific immunity (20 marks)