MEDICAL MICROBIOLOGY AND IMMUNOLOGY

SECTION I: MULTIPLE CHOICE QUESTIONS (20 marks)

1. *Histoplasma capsulatum*can exist as molds in soil and yeast in tissues, hence termed as:
   a) Diploid
   b) Diplococcus
   c) Dimorphic
   d) Polymorphic
2. A nurse notices a HIV patient respond well to meningitis antifungal treatment. The likely causative agent is:-
   a) *Cryptococcus*
   b) *Cryptococcus neoformans*
   c) *Candida albicans*
   d) *Neisseria meningitidis*
3. Molds:-
   a) Reproduce by budding
   b) Are filamentous
   c) Are single celled
   d) Are round in shape
4. Fungi are different from plants because: -
   a) They lack organelles
   b) They are heterotrophs
   c) They are autotrophs
   d) They have cell walls
5. The role of bacterial capsules as virulence factors is usually related to their ability to interfere with: -
   a) Antibody binding
   b) B lymphocyte activation
   c) Antibacterial penetration of bacterial cells
   d) Phagocytosis
6. A nurse is caring for a patient who has explosive rice-like watery diarrhoea and vomiting. The likely cause is:-
   a) *Campylobacter jejuni*
   b) *Helicobacter pylori*
   c) *Vibrio cholerae*
   d) *Staphylococcus aureus*

7. A pioneer Microbiologist credited with the discovery of microorganisms using high quality magnifying lenses (early microscopes) is:-
    a) Anton Van Leeuwenhoek
    b) Louis Pasteur
    c) Robert Hooke
    d) Robert Koch

8. Gram negative and gram positive bacteria stain the following colors respectively:-
    a) Pink and purple
    b) Blue and purple
    c) Red and Pink
    d) Purple and Red

9. An outbreak of sepsis caused by *Staphylococcus aureus* has occurred in the newborn nursery. You are called upon to investigate. According to your knowledge of the normal flora, what is the most likely source of the organism?
    a) Nose
    b) Colon
    c) Hand
    d) Throat

10. What would be the term used to describe the shape of these bacteria?
    a) Sarcina
    b) Coccobaccilus
    c) Vibrio
    d) *Spirilla*

11. The following are gram negative cocci bacteria:-
    a) Staphylococcus aureus, Streptococcus pyogenes and Neisseria Meningitidis
    b) Moraxella cartarrhalis, Neisseria meningitidis, and Neisseria gonorrhoea
    c) Streptococcus mutans, Neisseria meningitis and Neisseria gonorrhea
    d) Salmonella typhi, Campylobacter jejuni and Helicobacter pylori

12. The following viruses belong to the family filoviridae:-
    a) Ebola and HIV virus
    b) Ebola and Marburg virus
    c) Marburg and Dengue fever viruses
    d) Yellow fever and Dengue fever viruses

13. Zika virus is one of the World's re-emerging viruses today midwives need to pay attention to. It belongs to _____family.
    a) Adenoviridae
    b) Paramyxoviridae
    c) Flavivridae
    d) Picornaviridae

14. Viruses that can remain latent (usually in neurons) for many years are most likely:
    a) Herpesviruses
    b) Enteroviruses
    c) Rhinoviruses
    d) Retroviruses

15. True about Hepatitis virus:-
    a) Hepatitis A virus is a picornaviridae DNA virus transmitted through fecal oral route
    b) Hepatitis C and B are RNA and DNA viruses respectively and both are transmitted through contaminated blood
    c) Hepatitis C is a flaviridae RNA virus transmitted through fecal oral route and via contaminated blood
    d) Hepatitis B is a hepadnaviridae RNA virus transmitted through unprotected sexual intercourse with an infected person

16. B and T cells are produced by stem cells that are formed in:-
    a) Bone marrow
    b) The liver
    c) The spleen
    d) The lymph nodes

17. B cells mature in the_____ while T cells mature in the_____, respectively
    a) Thymus/bone marrow and gut associated lymphoid tissue (GALT)
    b) Spleen/bone marrow and GALT
    c) Bone marrow and GALT/Thymus
    d) Liver/Kidneys

18. The immune cells/molecules that are most effective at destroying intracellular pathogens are:-
    a) T helper cells
    b) B cells
    c) Antibodies
    d) T cytotoxic cells

19. The ability of the immune system to recognize self antigens versus non-self antigen is an example of:
    a) Specific immunity
    b) Tolerance
    c) Cell mediated immunity
    d) Humoral immunity

20. Naturally acquired active immunity would be most likely acquired through which of the following processes?
    a) Vaccination
    b) Drinking colostrum
    c) Natural birth
    d) Infection with disease causing organism followed by recovery.

SECTION II SHORT ANSWER QUESTIONS (30 MARKS)

1. Explain the following concepts giving relevant examples (6 marks)
    i. Selective toxicity
    ii. Clonal expansion
    iii. Culture and sensitivity
2. With the help of relevant examples differentiate between vertical and horizontal transmission of microbial infections (4 marks)
3. State four (4) non-specific defense mechanisms of the body giving relevant examples. (4 marks)
2. Paramyxoviridae is a common family of RNA viruses that is targeted in routine childhood immunizations. List three examples of viruses that belong to this family (1.5 marks)
3. Name, in order, the seven (7) steps of viral replication cycle (3.5 marks)
4. State three (3) differences between molds and yeasts (3 marks)
5. State three virulent factors of *Staphyloccocus aureus* (3 marks)
6. Draw a well labeled diagram of a bacterial cell (5 marks)

SECTION III - LONG ANSWER QUESTIONS **20 MARKS**

One of the major challenges in clinical set-ups faced by patients and health care providers are opportunistic infections. This has not only cost hospitals millions of shillings, but they have also cost families heavily due to prolonged hospitalizations. Yet, this chain of infection can easily be broken at the various stages of the infectious cycle, a role nurses have to actively engage in.

i. Define a nosocomial infection (1 marks)

ii. State the six (6) elements of the chain of infection (6 marks)

iii. Describe how you can break the chain of infection at specific stages of the chain of infection (13 marks)