



KENYATTA UNIVERSITY

**EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY
(BPharm Level II)**

HMM 220: MEDICAL MICROBIOLOGY I

2ND SEMESTER 2021/2022

TIME: 2 HOURS

INSTRUCTIONS:

- i. Attempt ALL Questions
- ii. Section A (MCQ): Choose the correct answer
- iii. Answer questions in Sections B and C in the booklets provided

SECTION A: MULTIPLE CHOICE QUESTIONS (30 X 1 = 30 MARKS)

1. The mononuclear phagocyte system does not include:
 - a) Monocytes
 - b) Kidney mesangial cells
 - c) Kupffer cells
 - d) Endothelial cells
2. ONE of the following statements is true concerning polymorphonuclear neutrophils
 - a) Is a bone marrow stem cell.
 - b) Is closely similar to a mast cell
 - c) Has granules which stain with eosin.
 - d) Contains microbicidal cytoplasmic granules.
3. Complement component C3 is cleaved by:
 - a) C3b
 - b) Factor B
 - c) C3bBb
 - d) Factor D
4. The following is a feature of B and not T cells
 - a) Contains class I MHC
 - b) Polyclonal activation by concanavalin A.
 - c) Surface immunoglobulin.
 - d) Measles virus receptor

5. The first immunoglobulin heavy chain class to be expressed on the surface of a newly produced B-cell is:
 - a) IgG
 - b) IgD
 - c) IgM
 - d) IgE
6. Major histocompatibility complex (MHC) refers to a large group of genes that code for proteins that play an essential role in
 - a) Phagocytosis by neutrophils
 - b) Antigen presentation to T lymphocytes
 - c) Phagocytosis by macrophages
 - d) Antigen presentation to B lymphocytes
7. Central tolerance refers to
 - a) Destruction of lymphocytes that are specific for self-antigens
 - b) Destruction of lymphocytes that are not specific for self-antigens
 - c) Destruction of self-antigens that are not specific for lymphocytes
 - d) Production of self-antigens that are specific for lymphocytes
8. Myelogenous leukemias are caused by the cancerous production of innate (non-specific) immune system cells. The tissue in which such production most likely to occur is
 - a) Thymus
 - b) Bone marrow
 - c) Lymph node
 - d) Spleen
9. ONE of the following cell types of the innate immune system does not perform phagocytosis
 - a) Basophils
 - b) Macrophages
 - c) Eosinophils
 - d) Neutrophils
10. Macrophage activation to kill intracellular pathogens is primarily mediated by
 - a) IL-2
 - b) IFN γ
 - c) GM-CSF
 - d) IL-12
11. The scientific name of parasite is represented by one of the following systems
 - a) Phylum and species
 - b) Genus and species
 - c) Class and order
 - d) Family and Genus
12. ONE of the following parasites is not an intestinal protozoa
 - a) *Entamoeba histolytica*
 - b) *Trichomonas vaginalis*
 - c) *Giardia lamblia*
 - d) *Entamoeba coli*

13. One of the following parasites is a protozoa commensal
- Entamoeba coli*
 - Entamoeba histolytica*
 - Giardia lamblia*
 - Trichomonas vaginalis*
14. The number of trophozoites produced in each excystation in *Entamoeba histolytica* is
- Two
 - Four
 - Eight
 - Numerous
15. Ciliates of medical importance are
- Commensals
 - Mutualistic
 - Parasitic
 - Symbiots
16. ONE of the following parasites is not a protozoan
- Leishmania donovani*
 - Trypanosoma gambiense*
 - Plasmodium falciparum*
 - Ascaris lumbricoides*
17. The portal of entry of *Schistosoma mansoni*
- Ingestion of food substances contaminated by bilharzia eggs
 - Contact with water that is contaminated by bilharzia cercaria
 - Walking bare feet in unhygienic environment
 - Conducting activities in contaminate soil
18. ONE of the following parasites is not a blood sucking arthropod
- House flies
 - Tsetse flies
 - Black flies
 - Sand flies
19. ONE of the following statements is NOT true about protozoa
- They are generally endoparasites.
 - The single cell unit performs all functions of life
 - They do not have nucleus
 - Food is stored in food vacuoles as glycogen
20. ONE of the following statements is true of protozoa structures
- Cytoplasm is differentiated into ectoplasm and endoplasm
 - Structure of the cytoplasm is seen only in amoeba
 - Cytostome is a cell "mouth" for ingesting fluids or solid particles.
 - Food synthesis takes place in the endoplasma
21. ONE of the following components is present in gram-negative bacteria but not in gram-positive bacteria
- Peptidoglycan
 - Lipid A
 - Capsule
 - Flagella

22. Most bacteria require vitamins as
- Growth factors
 - Sources of energy
 - Sources of carbon
 - Sources of electron donor
23. Diseases that are easily spread from one person to another are called
- Subclinical diseases
 - Non-clinical diseases
 - Contagious diseases
 - Communicable diseases
24. The purpose of swan necked flasks that Louis Pasteur designed to disapprove spontaneous generation is to
- Allow multiplication of microbes in the broth
 - Implicate the role of flies in the development of maggots on rotting meat
 - Pasteurize the meat broth
 - Trap the microbe-laden dust particles and prevent them from reaching the broth
25. The use of antibiotics that inhibit or inactivate cellular ribosomes will result directly in the loss of one of the following functions
- DNA replication
 - Phagocytosis
 - Protein synthesis
 - Cell division
26. Ionizing radiations kill microorganisms by:
- Causing double and single stranded defects in their DNA
 - Inducing the formation of purine and pyrimidine dimers between adjacent molecules in the same strand
 - Causing damage to the cell membrane
 - Coagulating cellular proteins
27. Identify the bacterium that can thrive at refrigeration temperatures:
- Proteus vulgaris*
 - Pseudomonas putida*
 - Legionella pneumophila*
 - Serratia mercenscens*
28. A group of teenagers became ill with nausea, vomiting, severe abdominal cramps, and diarrhea after eating undercooked hamburgers from a local restaurant. Two of the teenagers were hospitalized with hemolytic-uremic syndrome. *Escherichia coli* O157:H7 was isolated from the patient's stools as well as from uncooked hamburgers. The H7 refers to which bacterial antigen?
- Lipopolysaccharide
 - Capsular
 - Flagellar
 - Fimbrial
29. The major effect of a temperature of 60°C on the growth of a mesophile such as *Escherichia coli* is to
- Destroy the cell wall
 - Denature proteins
 - Destroy nucleic acids
 - Solubilize the cytoplasmic membrane

30. Bacteria that are obligate intracellular pathogens of humans are considered to be
- Autotrophs
 - Hyperthermophiles
 - Heterotrophs
 - Chemolithotrophs

SECTION B: SHORT ANSWER QUESTIONS (50 MARKS)

1. Explain the process of T cell activation (5 marks)
2. Explain the theory of clonal selection (5 marks)
3. State the role of phagocytes in innate immunity (5 marks)
4. State any five secondary lymphoid organs (5 marks)
5. Explain epidemiology of amoebiasis (5 marks)
6. Define the following types of parasites (5 marks)
 - a) Endo-parasite
 - b) Ecto-parasite
 - c) Accidental parasite
 - d) Obligate parasites
 - e) Heteroxenous
7. State the different types of symbiosis in medical parasitology and give an example in each (5 marks)
8. State the different types of hosts in medical parasitology (5 marks)
9. Explain how aeration affects bacterial growth (5 marks)
10. a) Define binomial nomenclature (1 mark)
b) State four rules of binomial nomenclature (4 marks)

SECTION C: ESSAY QUESTION (40 MARKS)

1. a) Briefly describe immune responses to endogenous and exogenous pathogens (10 marks)
b) Give five examples of unicellular and five multicellular parasites citing their respective habitats in the human body (10 marks)
2. a) Describe the acid-fast staining technique and state its application in the clinical microbiological laboratory (10 marks)
b) Describe the principle, purpose and expected outcomes of the following bacterial identification tests
 - i) Urease test (3 marks)
 - ii) Citrate utilization test (3 marks)
 - iii) Triple sugar Iron test (4 marks)