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FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
SCHOOL	VETERINARY MEDICINE		
DEPARTMENT	PARACLINICAL STUDIES		
PROGRAMME	VETERINARY MEDICINE		
MODULE	VETERINARY MICROBIOLOGY II		
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DURATION	**3 HOURS**	**MARKS**	150

FIRST OPPORTUNITY EXAMINATION

Examiners: Prof. C Ntahonshikira, Prof. U Molini and Mrs. M Amukwaya
Internal Moderator: Dr. M. Y. Hemberger
External Moderator: Prof. F Giovanni

This Paper consists of seven (7) pages including the front page

Instructions

Read the questions carefully
Answer all questions
Write clearly and concisely
Hand in this question paper together with the answer booklet
Additional material to be supplied: None

SECTION A: MULTIPLE CHOICE QUESTIONS. **[20 MARKS]**

Choose the correct answer **[20 marks, 1 mark each]**

1. MSA stands for:
   a. Mannitol Staphylococcus Aureus
   b. Mannitol Salt Agar
   c. Media for Staphylococci Agar
   d. Main staphylococcus agar

2. Acidophiles are microorganisms that prefers the following conditions:
   a. Temperature between 25°C and 37°C
   b. pH between 6 and 8
   c. pH between 3-5
   d. Extremely high temperatures.

3. The growth of microorganisms can be measured by:
   a. Increase in number
   b. Their ability to grow in the presence of oxygen
   c. Their ability to grow at 37°C
   d. None of the above

4. Important gaseous cycles are:
   a. Nitrogen cycle
   b. Water cycle
   c. Carbon cycle
   d. All of the above

5. Macronutrients are nutrients that are:
   a. Required in very small amounts
   b. Required in relatively large amounts
   c. Not essential for growth
   d. None of the above

6. Desiccation is:
   a. The removal of moisture from the body of an organism.
   b. The rehydration of the microorganism to revive it.
   c. Filtration to remove contaminants
   d. Lyophilization

7. Common methods of dry heat in the laboratory:
   a. Boiling water
   b. Pasteurization
   c. Bunsen burner

d. Incineration

8. To achieve a proper sterilization of any instrument the following shall be done:
   a. Pre-sterilization cleaning
   b. A septic storage
   c. Sterilization process
   d. All of the above

9. An ecological habitat is:
   a. The place where an organism lives
   b. A character that an organism exhibit
   c. The role of the organism in the community
   d. The site where the microorganism causes most of damages.

10. Cell counting can be done by:
    a. Direct microscopic count
    b. Plate- counting
    c. Membrane filter count
    d. All of the above

11. Gram+ single or short chain cocci, causing strangles in horses:
    a. *Streptococcus agalactiae*
    b. *Streptococcus dysgalactiae*
    c. Streptococcus equi
    d. *Staphylococcus equinus*

12. Bacteria with a more porous cell wall, does not retain purple stain, appears red/pink/orange after Gram straining procedure
    a. Gram negative bacteria
    b. *Candida albicans*
    c. *Gram positive bacteria*
    d. *Mycoplasma* species

13. Pyogenic bacteria are:
    a. Pus producing bacteria
    b. Pathogenic bacteria
    c. Slime bacteria
    d. Toxigenic bacteria

14. Poison secreted by some types of Gram+ bacteria, usually a protein:
    a. Endotoxin
    b. Lipopolysaccharide (LPS)
    c. Exotoxin
    d. Nystatin

15. Bacteria and fungi (especially those which are pathogenic) multiply best:
    a. below 16°C
    b. between 16-38°C
    c. above 38°C
    d. none of these

16. Fungi that lack partitions (septa) are called
    a. ahyphae
    b. coenocytic
    c. yeast
    d. conidiophores

17. A culture broth tube was very turbid at the surface but clear throughout the rest of the tube indicating that the
    a. organisms are aerobic
    b. organisms should be grown in an anaerobic chamber
    c. organisms cannot produce superoxide dismutase
    d. organism cannot tolerate oxygen

18. Which of the following characteristics would not be used to classify viruses?
    a. Type of cell wall structure
    b. Type of nucleic acid
    c. Presence of an envelope
    d. Capsid Symmetry

19. The two major components of viruses are:
    a. fat and protein
    b. nucleic acid and protein
    c. carbohydrate and nucleic acid
    d. fat and carbohydrate

20. Mycotoxins are produced by:
    A. *Penicillium* species
    B. *Aspergillus* flavus
    C. Mucor
    D. All of the above

SECTION B: TRUE/FALSE QUESTIONS AND COMPLETE SENTENCES **[40 MARKS]**

QUESTION 1. Indicate whether the statement is TRUE or FALSE **[20 marks, 1 mark each]**

1. Virulence is virus's relative capacity to cause disease in a host.
2. The specimens selected for laboratory examination should relate to the clinical signs.

3. Some viruses remain latent in host tissues and only cause disease under specific environmental conditions.
4. Candling is the process of holding a strong light above or below the egg to observe the embryo.
5. Arboviruses are defined as viruses maintained in nature by haematophagous arthropods.
6. A disinfectant is a chemical germicide formulated for use on inanimate surfaces.
7. Cell culture consists of cells grown in culture media in the laboratory.
8. The maintenance of infection in a population requires continuous infection of susceptible animals.
9. The interaction between the virus and the receptor can result in a structural change of the virus particle necessary to penetrate in the host cell.
10. haemagglutination is a diagnostic method that show the capacity of some viruses to interact with animal leukocytes.
11. Heterotrophic organisms can make their own foods.
12. Selective media are formulated with inhibitors such as antibiotics.
13. A viable count is a direct counting method in which dead cells are counted too.
14. Asexual reproduction is characteristics of all bacteria.
15. The microbes living in extreme conditions are called extremophiles.
16. Many phytoplankton are single-celled algae.
17. Enterococci are Gram-positive bacteria even though found in the gastrointestinal tract.
18. *Bacillus* and *Clostridium sp.* are Gram-positive non-spore forming bacteria.
19. Mycoplasmas and mycobacteria belong to the same family.
20. Exotic infectious diseases are those diseases which occur in exotic breeds.

QUESTION 2. FILL /COMPLETE THE FOLLOWING SENTENCES **[20 MARKS, 2 Marks each]**

1. Pathogenicity is the ability of a microbe to cause disease, whereas virulence is.....
2. Most fungal species that infect animals are limited to the superficial skin or subcutaneous tissues. However, fungal infections in the ..... host can be very serious.
3. Supp. ..... fungal infections are the most serious.
4. *Aspergillus* spp. are the cause of serious ..... especially in chickens fed ..... moldy feed.
5. Zygomycete are also known as ..... as they grow so intensely and cannot fit in a closed Petri dish.
6. Differential media are used to ..... closely related organisms or group of organisms.
7. EMB agar is a differential medium used for the detection and isolation of ..... intestinal pathogens.
8. ..... is material or methods that is usually used to remove or kill all microorganisms.
9. Pathogenic bacteria are normally incubated at .....^{0}C for ..... hrs.

SECTION C: SHORT ANSWER QUESTIONS. **[20 MARKS]**

QUESTION 1. Name three (3) media commonly used to selectively culture microscopic fungi. [3]

QUESTION 2. Briefly explain what the suffix "-emia" mean and give one example of this concept. [3]

QUESTION 3. In terms of microbial pathogenicity, define the lethal dose 50 ($\mathbf{LD_{50}}$). [2]

QUESTION 4. Give two (2) of well-known examples of fungal zoonoses. [2]

QUESTION 5. Mention three (3) types of haemolysis created by bacteria on blood agar. [3]

QUESTION 6. Define the term "virus". [2]

QUESTION 7. Describe the factors influencing the duration of viremia. [3]

QUESTION 8. Define "pasteurization" [2]

SECTION D: STRUCTURED QUESTIONS **[70 MARKS]**

QUESTION 1. **[10]**

a. Outline the properties of an ideal antibiotic. [5]

b. Name five (5) possible mechanisms of antibiotic resistance used by microorganisms. [5]

QUESTION 2. **[10]**

a. Differentiate between Antiseptic, Disinfectants and Preservatives. [6]

b. Name four (4) factors influence the effectiveness of antimicrobial treatment. [4]

QUESTION 3. **[10]**

a. List five (5) predisposing factors for fungal infections. [5]

b. Answer the following questions about *Mycobacterium* and *Brucella* species. [5]

i. *Mycobacterium bovis* causes ..... Name the main diagnostic methods of this disease in live animals and in dead animals. [3]

ii. Name the main zoonotic *Brucella* species and the *Brucella* species that causes the disease in cattle. [2]

QUESTION 4. **[10]**

a. Compare and contrast mechanical and biological vectors of (infectious and other) diseases. Give one example in each case. [6]

b. Differentiate between "infectious disease" and "infection". [4]

QUESTION 5. **[10]**

With the help of a diagram explain the procedure for 10-fold serial dilution of a clinical sample or culture. [10]

QUESTION 6. **[10]**

Based on the pathogenesis of a virus, draw and/or describe the typical stages that occur during a viral infection. [10]

QUESTION 7. **[10]**

a. Indicate the ecological factors limiting the distribution of arboviruses [4]

b. Summarize Koch's postulates which allow to establish the relationship between an infectious disease and its causative agent. Explain the reason why one may fail to demonstrate that a given microorganism is responsible to cause a disease using these postulates. [6]

END OF EXAM PAPER