UNIVERSITY OF NAMIBIA

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

SECOND OPPORTUNITY EXAMINATION

Examiners: Prof. C. Ntahonshikira, Prof. U. Molini & Mrs. M. Amukwaya
Internal Moderator: Dr. MY Hemberger
External Moderator: Prof. Giovanni Franzo

This **Question paper** consists of **seven (7)** pages including this front page.

Instructions

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]

1. EMB agar stands for:
    a. *E. coli* Medium Batch agar
    b. Erythromycin Media Black agar
    c. Eosin methylene blue agar
    d. All of the above

2. Neutrophiles are microorganisms that prefer 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. Measurement of some component of cell structures
    d. Both a and c

4. Important gaseous cycles are:
    a. Waste cycle
    b. Oxygen cycle
    c. Carbon cycle
    d. Both b and c

5. Micronutrients 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. Chemical control:
    a. Is the removal of moisture from the body of a microorganism.
    b. Is the rehydration of the microorganism to revive it.
    c. Involves the use of antimicrobial chemicals
    d. All the above

7. Common methods of moist sterilization:
    a. Incinerator
    b. Autoclave

c. Bunsen burner
d. Hot air oven

8. Halogens are:
   a. A Pre-sterilization cleaning method
   b. Aseptic techniques
   c. A family of elements with a high affinity for electrons.
   d. All of the above

9. An ecological niche is:
   a. The place where an organism lives
   b. A character that an organism exhibit
   c. The role of the organism in the environment
   d. The way a microorganism interacts with its environment

10. Cell counting can be done by:
   a. Direct microscopic count
   b. Measuring tape
   c. Zone of inhibition
   d. All of the above

11. The association of endotoxin in gram-negative bacteria is due to the presence of
   a. Steroids
   b. Peptidoglycan
   c. Lipopolysaccharides
   d. Polypeptide

12. Which of the statements regarding Gram staining is wrong?

   a. *Mycobacterium tuberculosis* stains blue because of the thick lipid layer
   b. *Streptococcus pyogenes* stains blue because of a thick peptidoglycan layer
   c. *Escherichia coli* stains pink because of a thin peptidoglycan layer
   d. *Mycoplasma pneumoniae* is not visible in the Gram's stain because it has no cell wall

13. Sheathed flagellum is seen in:
   a. *Listeria*
   b. *Leptospira*
   c. *Salmonella*
   d. *Leuconostoc*

14. Which of the following bacteria belong to the family *Enterobacteriaceae*?
   a. Yersinia
   b. Shigella
   c. Salmonella

d. All of these

15. Which of the following Gram-positive bacteria causes bumble foot in chickens?
    a. *Neisseria*
    b. *Streptococcus*
    c. *Staphylococcus*
    d. *Mycobacterium*

16. Gram-positive bacteria responsible for food poisoning is/are:
    a. Mycoplasmas
    b. Pseudomonas
    c. Clostridia
    d. All of these

17. Bacteria with cork-screw shaped forms are called:
    a. Bacilli
    b. Stalked bacteria
    c. Spirochetes
    d. Actinomycetes

18. Which among the following are called filamentous bacteria?
    a. Mycoplasmas
    b. Spirochetes
    c. Actinomycetes
    d. Vibrios

19. The differential staining of bacteria on Gram staining is due to:
    a. Difference in the cell structure of Gram positive and Gram-negative bacteria
    b. Difference in the mode of nutrition of Gram positive and Gram-negative bacteria
    c. Difference in the cell wall layer components of Gram positive and Gram-negative bacteria
    d. None of the above

20. The iodine used in Gram staining serves as
    a. Chelator
    b. Catalyst
    c. Mordant
    d. Cofactor

SECTION B: TRUE/FALSE QUESTIONS AND FILL IN/COMPLETE SENTENCES [30 MARKS]

I. STATE IF THE FOLLOWING STATEMENTS ARE TRUE OR FALSE [20 marks, @ 1 mark]

1. The egg used for cultivation must be sterile and the shell should be yellow.
2. According to the Baltimore classification system, viruses are divided into eight classes.
3. Non-enveloped viruses are usually released by budding.
4. Diploid culture derived from human or animal tumors and can be subcultured indefinitely.
5. Virus replication strategy is characterized by 4 consecutive steps: Attachment, Penetration, Replication, and Release.
6. Working cells can be stored at -80°C for more than 100 years.
7. The AGID or immunodiffusion test is a highly sensitive test for viral diseases.
8. Enveloped viruses are typically transported as naked nucleocapsids by macrophages along peripheral nerves.
9. To manage an outbreak several investigations and actions are needed.
10. The maintenance of infection in a population requires continuous infection of susceptible animals.
11. Viruses divide by binary fission as other microorganisms.
12. Selective media allow growth of all microbes.
13. Catalase is the enzyme responsible for degradation of hydrogen peroxide.
14. The microorganisms living in normal conditions are called extremophiles.
15. Microbes also live on other phylogenetically developed organisms.
16. *Listeria sp.* can grow in the fridge, hence spoiling products kept in it.
17. All viruses produce a cytopathic effect in the cells they infect.
18. Bacillus and Clostridium species are spore-forming and anaerobic bacteria.
19. Mycotic diseases are synonymous to fungal diseases
20. The virulence of a pathogenic microorganism is its degree or intensity of pathogenicity

II. FILL IN/COMPLETE THE FOLLOWING SENTENCES [20 MARKS]

1. A ..... infection is a small region of infection from which a pathogen may move to another part of the body to establish a second infection.
2. ..... is a good low-level disinfectant agent when used in concentrations of 3% or lower.
3. A ..... is a direct counting method in which all cells are counted, whether dead or alive.
4. Quantitative ability of an organism to cause disease is known as .....
5. Sabouraud's medium is used for the selective culture of .....
6. A ..... is a disease-causing microorganism.
7. ..... fungal infections are the most serious.
8. A horse steps on a rusty nail and develops tetanus. In this case, the horse has acquired a(n) ..... disease.
9. The concentration of pathogen needed to kill 50% of an infected group of test animals is the .....
10. A ..... is an animal that can transfer infectious pathogens from one host to another.

11. Non-pathogenic bacilli are called .....
12. Complete with the specific characteristics of Mycoplasma species. They colonies have a ..... appearance, while their cells don't have a .....
13. Mycoplasma species do not stain with Gram. Two methods are used to stain them; ..... and .....
14. ..... causes cheesy gland in sheep and goats.
15. *Bacillus anthracis colonies display a ....., while the stained bacteria show large rods showing ..... shape appearance with ..... ends.*
16. *Foot and mouth disease and ..... are the two diseases that led to the creation of veterinary cordon fence in Namibia.*

SECTION C: SHORT ANSWER QUESTIONS **[30 MARKS]**

Question 1. Answer the following questions on fungi and fungal diseases **[10]**

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

(b) Name the three main genera of fungi that cause dermatomycoses or ringworm [3]

(c) Name two (2) clearing solutions used to visualize fungal structures under microscope. [2]

(d) Name three (3) types of specimen that can be collected for fungal disease diagnosis. [3]

Question 2. Give 3 ways in which antagonism can be achieved. [3]

Question 3. Describe three (3) limitations of viable cell counts [3]

Question 4. Name three (3) heavy metals used in microbial growth control. [3]

Question 5. Mention three (3) mechanism of action of chemical disinfectants [3]

Question 6. Clinically classify fungal diseases based on the localization of infection (relative to skin surface). [4]

Question 7. Indicate the different disease statuses that an animal can experience during a viral infection. [4]

SECTION C: STRUCTURED QUESTIONS **[60 MARKS]**

Question 1. **[10]**

(a) Name three two (2) routine and two (3) advanced methods that can be used to test for a bacterial isolate's sensitivity to different antibiotics. [5]

(b) Discuss the possible options/proposals to combat antimicrobial resistance [5]

Question 2. **[10]**

(a) Staphylococci are commensal organisms but *Staphylococcus aureus* can cause serious infectious diseases in different animals. Name the main disease caused by this organism is cattle, in pigs and in dogs and cats. [3]

(b) Give the main common characteristics between the genera *Bacillus* and *Clostridium* and the main distinctive characteristic [5]

(c) Campylobacter, Helicobacter, Leptospira, Brachyspira and Treponema share the same morphological characteristic. They are called ..... [2]

Question 3. **[10]**

(a) Name the main phases of bacterial growth curve and briefly explain what happens in each phase. [8]

(b) Name two methods that are used to estimate the estimating total and viable counts of bacteria. [2]

Question 4. **[10]**

(a) Indicate the five steps of the virus replication strategy. [5]

(b) Discuss the transmission of respiratory and enteric viruses. [5]

Question 5. **[20]**

(a) Cell cultures used for the cultivation of viruses are separated into three types. Indicate and describe all of them in detail. [13]

(b) Virulence depends on various factors; indicate all of them. [7]

END OF PAPER