UNIVERSITY OF NAMIBIA

FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
SCHOOL	VETERINARY MEDICINE		
DEPARTMENT	PARACLINICAL		
PROGRAMME	VETERINARY MEDICINE		
MODULE	VETERINARY MICROBIOLOGY II		
MODULE CODE	V3611EM		
DATE	June 2023		
DURATION	**3 HOURS**	**MARKS**	**150**

SECOND OPPORTUNITY EXAMINATION

Examiners: Prof. C. Ntahonshikira, Prof. J.R. Lyaku and Prof. U. Molini
Internal Moderator: Dr. Hemberger Y. M.
External Moderator: Prof. Giovannni Franzo

This **Paper** consists of **eight (8)** pages including this front page.
Additional materials to be supplied: **None**

SECTION A: MULTIPLE CHOICE QUESTIONS [30 marks]

Choose the correct answer **[30 marks, @1 mark]**

1. The association of endotoxin in Gram-negative bacteria is due to the presence of:

a. Steroids
b. Peptidoglycan
c. Lipopolysaccharides
d. Polypeptide

2. Mycelium is associated with:

a. Fungi
b. Bacteria
c. Protozoa
d. Algae

3. Edward Jenner is credited with:

a. Applying germ theory to medical practices such as surgery
b. Discovering the antibiotic properties of penicillin
c. Creating steps to link a specific bacterium to a specific disease
d. Developing the process of vaccination

4. When you made a microscopic examination of bread mold, you saw dark structures at the tip. What are these structures called?

a. Hyphae
b. Mycelium
c. Rhizoid
d. Sporangium

5. The endotoxin produced by Gram-negative bacteria is present in:

a. Peptidoglycan
b. Lipopolysaccharide
c. Theichoic acid
d. Inner membrane

6. The basic stain used to demonstrate fungal components is:

a. Gram stain
b. Giemsa
c. Lactophenol cotton blue
d. Acid fast stain

7. The study of algae is known as

a. Algalogy
b. Phycology
c. Mycology
d. Bacteriology

8. Blood agar medium is a (n):

a. Enrichment medium
b. All-purpose medium
c. Selective medium
d. Differential medium

9. The temperature used for hot air oven sterilization is:

a. 100° C for 1 hour
b. 120° C for 1 hour
c. 160° C for 1 hour
d. 60°C for 1 hour

10. Culture media for fungi are:

a. Potato dextrose agar (PDA)
b. Sabouraud's dextrose agar
c. Czapekdox agar
d. All of the above

11. On MacConkey's medium *E. coli* forms:

a. Colourless colonies
c. Pink coloured colonies
c. Greenish pigmentation
d. Medusa head appearance

12. The pH required for the growth of most bacteria is:

a. 6.8 – 7.2
b. 5.6 – 8.2
c. 3.0 – 6.0
d. 8.0 – 14.0

13. What is the primary focus of infection for systemic mycoses?

a. Lung
b. Heart
c. Skin
d. Liver

14. _____ are the naked RNA strands infecting plants

a. Prions
b. RNA viruses
c. viroids
d. retroviruses

15. What is the other name for bovine spongiform encephalopathy?

a. Kuru disease
b. Mad cow disease
c. Mad dog disease
d. Sheep's prion disease

16. Vancomycin and penicillin do not affect the mycoplasma as:

a. They don't have a Golgi body
b. They don't have mitochondria
c. They don't have a nucleus
d. They don't have a cell wall

17. Which of the following diseases can be screened using Rose Bengal test in the field or in the laboratory?

a. Salmonellosis
b. Brucellosis
c. Bovine tuberculosis
d. Leptospirosis

18. Which of these bacterial components is least likely to contain useful antigens?

a. Cell wall
b. Flagella
c. Ribosomes
d. Capsule

19. Fungi are decomposers because they _____

a. Cause serious plant disease
b. Breakdown dead tissues
c. Perform photosynthesis
d. Prevent the growth of bacteria

20. Glassware is sterilized by:

a. Autoclaving
b. Hot air oven sterilization
c. Incineration
d. Flaming

21. Which of the following are the oxygen requirements of molds?

a. Strictly aerobic
b. Facultatively aerobic
c. Anaerobic
d. Microaerophilic

22. Which of the following are spore-forming bacteria?

a. *Bacillus* species
b. *Clostridium* species
b. Both a and b
d. None of them

23. Which of the following fungi causes severe epidemic disease of fish in the natural environment?

a. *Saprolegnia ferax*
b. *Saprolegnia parasitica*
c. *Neurospora crassa*
d. *Neurospora sitophila*

24. *Rhizopus* produces clusters of rootlike holdfasts called:

d. Stolons
b. Hyphae
c. Runners
d. Rhizoids

25. Medusa head colonies are characteristic of:

a. *Mycobacterium bovis*
b. *Bacillus anthracis*
c. *Pseudomonas auruginosa*
d. *Bacillus licheniformis*

26. Pulpy kidney disease is caused by:

a. *Clostridium novyi*
b. *Clostridium perfringens* type D
c. *Clostridium tetani*
d. *Clostridium septicum*

27. The selective medium for staphylococci is:

a. Blood agar
b. Nutrient agar
c. Mannitol salt agar
d. McConkey agar

28. Most fungi grow best with oxygen, at room temp, and under _____ conditions?

a. Slightly acidic
b. Slightly basic
c. Neutral pH
d. Dark

29. Which one of the following produces typical fried egg appearance colonies on solid media?

a. Mycobacteria
b. Mycoplasts
c. Mycoplasmas
d. *Bacteroides*

30. Lyme disease is caused by:

a. *Leptospira canicola*
b. *Treponema pallidum*
c. *Borrelia burgdorferi*
d. *Spirillum* spp.

SECTION B: TRUE/FALSE QUESTIONS AND FILL IN/COMPLETE SENTENCES **[40 marks]**

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

1. There are only two types of infectious agents, viroids, and prions, which are structurally less complex than viruses.
2. According to the Baltimore classification system, viruses are divided into seven classes.
3. There are no effective or practical treatments for most viral diseases of domestic animals, especially for livestock.
4. An antiseptic is a chemical germicide designed for use on the skin or mucous membranes.
5. Virus replication strategy is characterized by 5 consecutive steps: Assembly, Penetration, Attachment, Replication, and Release.
6. The symmetry of the nucleocapsid can be only Icosahedral or Helical.
7. Spike proteins are the principal structures of the capsid.
8. In the serum neutralization test (SNT), the titre of the serum is the lowest dilution at which the virus is neutralized.
9. The sensitivity of a diagnostic test is the percentage of uninfected animals in which the result is negative.
10. Cell culture consists of cells grown in a live host (mice or rabbits) in the laboratory.
11. Interferon has an innate ability to fight viral infections and is always circulating in the body.
12. Prokaryotic and eukaryotic organisms can possess a cell wall.
13. The minimum inhibitory concentration (MIC) of an antibiotic for a particular organism is equivalent to its minimum bactericidal concentration (MBC).
14. The isolation of numerous microorganisms from a normally sterile body site without signs of a disease should be viewed with suspicion.
15. All fimbriae (pili) have a specialized function in bacterial gene transfer.
16. The egg used for cultivation must be sterile and the shell should be intact and healthy.
17. In an individual animal, an infection always results in clinical disease.
18. Prokaryotic and eukaryotic organisms replicate by mitosis.
19. Quarantine remains a cornerstone in many animal disease control programs.
20. The spore substance normally present in high concentration but decreases during favourable growth conditions is the nucleic acid.

II. FILL IN/COMPLETE THE FOLLOWING SENTENCES **[20 marks, @ 1 mark]**

1. The type of cell reproduction in which small, new cells develop from the surface of an existing cell and then separate from the parent cell is known as ..... and is the normal mode of replication in .....
2. ..... developed his ideas about germ theory of disease by inoculating animals with attenuated organisms.
3. The antigen found in the cell wall is called ..... antigen
4. Scrapie in sheep is caused by .....
5. The method used to preserve bacteria in powder form is .....
6. In addition to peptidoglycan, Gram-positive bacterial cell wall contains .....
7. *Streptococcus pyogens* can be differentiated from *Enterococcus faecalis* by the ..... test.
8. The capsule and slime layer are together known as .....
9. Based on the arrangement of flagella *Pseudomonas aeuruginosa* is .....
10. The impermeability of spores is due to calcium .....
11. ..... of the Enterobacteriacea are NOT motile.
12. ..... and ..... are the main two species of *Salmonella.*
13. The natural habitat of clostridia is ..... and ..... of humans and animals
14. *Pseudomonas aeruginosa* is the causative agent of ..... in horses.
15. Organisms that are variable in shape or that can easily change their shape are qualified as .....
16. The movement towards chemical attractants such as nutrients and away from harmful substances is called .....
17. The process of endospore formation is known as .....

SECTION C: SHORT ANSWER QUESTIONS **[15 marks]**

Question 1. **[15 marks]**

(a) Besides tuberculosis, what other disease can *Mycobacterium sp.* cause in humans? [1]

(b) What are the three major animal pathogens in the Enterobacteriaceae family? [3]

(c) Which animal pathogens in the Enterobacteriacea family are opportunistic? [3]

(d) Name the two genera of the Streptococaccea family. [2]

(e) Are Enterobacteriacea bacteria Gram-positive or negative? [1]

(f) What are the capsule functions of *Pasteurella sp.* and *Mannhemia sp.*? [3]

(g) Which of the Enterobacteriacea give negative results in methyl red tests? [2]

SECTION C: STRUCTURED QUESTIONS **[65 marks]**

Question 1. **[10 marks]**

(a) According to the current knowledge, what is an ideal antibiotic? [9]

(b) What does the acronym "Prion" stand for? [1]

Question 2. **[10 marks]**

(a) Discuss the aims of antibiotic sensitivity testing. [5]

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

Question 3. **[10 marks]**

(a) Discuss the general characteristics of transmissible encephalopathies. [5]

(b) Discuss the predisposing factors for fungal infections. [5]

Question 4.

Indicate and describe the type of cell cultures used for routine cultivation of virus. **[6 marks]**

Question 5. **[10 marks]**

Describe the advantages and disadvantages on using laboratory animals for the cultivation of viruses.

Question 6. **[19 marks]**

To manage an outbreak several investigations and actions are needed. All the several actions and investigations can be carried out in 3 major phases (Early phase, Intermediate phase, Late phase). Indicate and describe the actions that need to be performed in the early phase.

END OF PAPER