UNIVERSITY OF NAMIBIA

FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
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FIRST OPPORTUNITY EXAMINATION

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This Memo consists of **ten (10)** 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 each]**

1. Mycoplasmas differ from the other prokaryotes by the:
   a. presence of chitin in cell walls
   b. presence of murrain in cell walls
   c. presence of proteins in cell walls
   d. absence of a cell wall

2. Mycoplasmas, rickettsiae and chlamydiae are:
   a. types of fungi
   b. small bacteria
   c. species of protozoa
   d. forms of viruses

3. The foundation for the germ theory of disease was set down by:
   a. Robert Koch
   b. Ronald Ross
   c. Louis Pasteur
   d. Walter Reed

4. Blue-green bacteria are called:
   a. Acquaobacteria
   b. Cyanobacteria
   c. Protozoa
   d. Arcanobacteria

5. The organisms that can be acid-fast stained are:
   a. Nocardia
   b. Tubercle bacilli
   c. Lepra bacilli
   d. All of these

6. Periplasm is

a. the area between the inner and outer membranes of Gram-negative bacteria
b. the area between the inner and outer membranes of Gram-positive bacteria
c. the interior portion of mitochondria
d. the area outside the cell membrane that is influenced by the polymers

7. Which of the following has Chinese letters arrangement?

a. *Bacillus anthracis*
b. *Mycobacterium tuberculosis*
c. *Clostridium tetani*
d. *Corynebacterium diphtheriae*

8. Bacterial cell counting can be carried out by:

a. direct microscopic count using Petroff-Hausser counting chamber
b. plate counting
c. membrane filter count
d. all of the above

9. Which of the following techniques may be performed quantitatively to determine the number of bacteria of a particular type?

a. Pour plate
b. Spread plate
c. Both (a) and (b)
d. Streak plate technique

10. Which of the following problems makes it impossible to satisfy all of Koch's postulates?

a. A microorganism causes serious symptoms in humans
b. A microorganism cannot be isolated in pure culture
c. The species of microorganism is in question
d. Genes from the microorganism cannot be amplified by PCR

11. Plate counts are often reported as:

a. Colony forming unit/ml
b. CFU/ml
c. Both (a) and (b)

d. thousands/ml

12. Staphylococci are relatively:
    a. heat tolerant
    b. salt tolerant
    c. resistant to dyes
    d. tolerant to heat and salt
    e. pleomorphic

13. Capsules, sheaths, and slime layers generally aid with:
    a. nutrient transport
    b. cell attachment
    c. chemotaxis
    d. heat resistance
    e. emulsification

14. Which among the following are "spirochetes"?
    a. *Streptomyces* sp.
    b. *Treponema pallidum*
    c. *Spirillum volutans*
    d. *Corynebacterium diphtheriae*

15. *Staphylococcus aureus* is a:
    a. Mesophile
    b. Mesophile and psychrophile
    c. Psychrophile
    d. Thermophile

16. Growth of bacteria or microorganisms refer to:
    a. changes in the total population
    b. an increase in number of cells
    c. an increase in the size of an individual organism
    d. an increase in the mass of an individual organism

17. Which of the following terms refers to the ability of an antimicrobial drug to harm the target microbe without harming the host?

a. Mode of action
b. Therapeutic level
c. Spectrum of activity
d. Selective toxicity

18. Which of the following method can be used to determine the number of bacteria quantitatively?

a. Spread-plate
b. Streak-plate
c. Pour-plate and spread plate
d. Pour plate

19. Cryptococcosis is a:

a. viral infection
b. mycotic infection
c. parasitic infection
d. bacterial infection

20. Pathogenic fungi have an optimum growth temperature at:

a. 30 to 37 degrees Celsius
b. 22 to 30 degrees Celsius
c. 37 to 42 degrees Celsius
d. 42 to 50 degrees Celsius

21. The optimum pH for the growth of fungi is:

a. 7.8-9.0
b. 12-14
c. 3.8-5.6
d. 1.0-2.0

22. To which of the following antibiotics are fungi sensitive?

a. Penicillins
b. Tetracyclins

c. Chloramphenicol

d. Griseofulvin

23. Viral protein particles which can infect host cells are called:

a. Virons

b. Prions

c. Nucleoida

d. None of these

24. Selective media facilitate the growth of only one kind of organism. Sabouraud medium is used to selectively isolate:

a. coliform bacteria

b. Gram-positive bacteria

c. yeasts

d. acid-fast organisms

25. Saprophytic fungi

a. engulf their food in order to break it down.

b. secure their food from dead organic materials

c. both (a) and (b)

d. none of the above

26. Fungi that lack partitions (septa) are called

a. ahyphae

b. coenocytic

c. yeast

d. conidia

27. A chemical used for removal of microorganisms from mucous membranes and skin is called:

a. detergent

b. alcohol

c. pesticide

d. antiseptic

28. The circular, double-stranded and extrachromosomal DNA, that can replicate independently of bacterial chromosome, is called:

a. Plasmid
b. Cosmic
c. Vector
d. Template

29. The dimension of viruses can range from: [1]

a. 20 to 300 nm
b. 20 to 300 μm
c. 600 to 900 nm
d. 10 to 100 nm

30. To preserve the infectivity or antigenicity of viruses the collected samples, if not immediately tested, should be: [1]

a. frozen at -70°C
b. frozen at -20°C
c. refrigerated at +4°C
d. preserved in ethanol 70%
e. preserved in formalin 10%

SECTION B: TRUE/FALSE QUESTIONS AND COMPLETE SENTENCES **[30 marks]**

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

(a) The isolation of numerous microorganisms from a normally sterile body site without the presence of inflammatory cells should be viewed with suspicion.
(b) Streptococci and enterococci are anaerobic Gram-positive bacteria.
(c) Signs of brucellosis include epididymitis, spontaneous abortions, green-gray vaginal discharge.
(d) *Staphylococcus* sp. and *Clostridium sp.* are non-spore forming bacteria.
(e) *Staphylococcus pseudintermedius* is of no zoonotic concern.
(f) *Listeria sp.* are catalase-positive facultative anaerobic bacteria.
(g) *Listeria sp.* cannot grow in the fridge but can grow on non-enriched media over a wide range of temperature.

(h) Penicillin causes the growth inhibition of mycoplasmas.

(i) Fungal diseases that occur on the nails, skin, hair are referred to as systemic mycoses.

(j) The systemic mycoses are caused mainly by air-borne organisms.

(k) Infectivity is the capacity of the microorganisms to produce disease in the host.

(l) Streptococci are always associated with diseases.

(m) Sporulation of *Bacillus anthracis* is inhibited by exposure to air.

(n) All *Brucella* species are obligate parasites and have preference to localize in the genital tract.

(o) Brucellosis can be diagnosed using hypersensitivity reaction.

(p) Mycoplasmas are sensitive to penicillin.

(q) The specimens selected for laboratory examination should relate to the clinical signs.

(r) Some viruses do not produce a cytopathic effect.

(s) The prevention, control, and eradication of veterinary and zoonotic diseases are increasingly more complex in the globalization era.

(t) The surveillance of a viral disease provides basic information to implement its control program.

QUESTION 2. FILL /COMPLETE THE FOLLOWING SENTENCES **[10 marks, 1 mark each]**

(a) *Erysipelothrix* spp. are oxidase ....., non-motile..... anaerobes.

(b) ..... causes porcine cystitis and pyelonephritis 3-4 weeks after .....

(c) ..... and ..... are diseases of sheep caused *Dermatophilus congolensis*.

(d) F plasmids are also known as ..... plasmids, while R plasmids are also called .....plasmids

(e) A ..... is a disease-causing microorganism.

(f) ..... is the commonest method for testing antibiotic sensitivity of bacteria.

SECTION C: SHORT ANSWER QUESTIONS **[20 marks]**

QUESTION 1. When bacteria are actively growing, their numbers increase in what fashion? [1]

QUESTION 2. The conditions employed for destruction of endospores in an autoclave are... [3]

QUESTION 4. Which drug would you recommend after performing an antibiotic sensitivity test?

QUESTION 5. How much blood do you need to add into agar base for a blood culture? [1]

QUESTION 6. Name the three different categories of bacteria based on the growth inhibition zone sizes that determine the susceptibility of these bacteria towards antibiotics in a disk diffusion method? [3]

QUESTION 10. Name the fungal genera which are members of zygomycetes. [3]

QUESTION 11. List the types of acellular infectious agents. [3]

QUESTION 12. List four (4) environmental conditions that endospores are resistant to. [4]

QUESTION 13. How do fungi absorb their food from the surrounding environment? [1]

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

Question 1. **[10 marks]**

(a) What is the main component of bacterial cell walls? [1]

(c) What are the three mechanisms that bacteria use to exchange DNA? [3]

(d) What are bacteriophages and what do they do? [3]

(e) What are plasmids? [1]

(f) What is the genetic difference between a bacteriophage and a plasmid? [2]

Question 2. **[10 marks]**

(a) Name the *Dermatophilus spp.* that is of veterinary importance. [1]

(b) What are the three steps involved in the pathogenesis of dermatophilosis? [3]

(c) Which three factors increase the likelihood of *Dermatophilus spp.* infections in animals? [3]

(d) Name three methods used to diagnose Dermatophilosis [3]

Question 3. **[10 marks]**

(a) Discuss the mechanism of action of different antibiotics in a bacterial cell. [5]

(b) Both *Bacillus* and *Clostridium* species produce important diseases in livestock and domestic animals. Give:

i. Three common characteristics for both genera (i.e. *Bacillus* and *Clostridium*). [3]

ii. One main difference between the two species. [2]

Question 4. **[10 marks]**

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

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

Question 5 **[10 marks]**

(a) Relative to the skin surface classify fungal infections. [4]

(b) How are diseases caused by fungal toxins called? [1]

(c) Indicates 5 strategies that can contribute in the control, prevention and eradication of viral diseases. [5]

Question 6 **[10 marks]**

To manage an infectious 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.

Question 7 **[10 marks]**

(a) According to the Baltimore classification system, viruses are divided into classes. Indicate how many classes and describe all of them. [7]

(b) Give the definition of the acronym ELISA and indicate the advantage and disadvantage of the molecular test methods. [3]

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