NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION : BACHELOR OF MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	**LEVEL:** 6
COURSE CODE: MMB611S	**COURSE NAME**: MEDICAL MICROBIOLOGY 2A
SESSION: JULY 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 120

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	**Mrs Fredrika Engelbrecht**
MODERATOR:	**Ms Vanessa Tjijenda**

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

SECTION A (25)

QUESTION 1 [15]

Assess the following statements and decide whether they are **true or false**. Write only the number of the question and next to it TRUE for a true statement and FALSE for a false statement and **give a reason for calling a statement FALSE. (2 marks allocated to False with a reason, and 1 mark allocated to true).**

1.1 Yeasts are single-celled and reproduce by binary fission.

1.2 The normal flora of a host is influenced by the host's age, health, and nutritional status.

1.3 Labelled, biohazardous bags must be used to dispose of all potentially contaminated samples.

1.4 The basic function of the objective of a microscope is to collect light after it passed through the specimen, and then project an accurate, real, inverted image of the specimen.

1.5 Fluorochromes are the active ingredients in are fluorescent objects seen under the microscope.

1.6 The cell wall of Mycobacteria contains a waxy substance known as mycolic acids that resist staining with ordinary stains.

1.7 India ink is considered a negative stain.

1.8 Specific gravity of > 1.020 on a urine dipstix indicates relative hydration.

1.9 A positive dipstick nitrite indicates the presence of organisms in the urine in significant numbers.

1.10 The periplasmic space of gram-negative bacteria contains degradative enzymes.

1.11 Biochemical structures that impart unique serological identity to gram negative species are the somatic antigens.

1.12 Among clinically significant bacterial endospores are formed by only by aerobic, gram-positive bacilli.

QUESTION 2 [10]

Choose the correct answer and report only the suitable letter next to the relevant question number.

2.1 Iatrogenic infection can be defined as:
- A) An infection produced by medical interventions.
- B) An illness caused by a replicating or multiplying of an external agent.
- C) An illness that can be transmitted from patient to patient.
- D) An illness that can be transmitted from an external source to a patient. [1]

2.2 Biosafety level II include those that:
- A) Have no known pathogenic potential for immune-competent persons.
- B) Agents most commonly being sought in clinical specimens.
- C) Have material suspected of harbouring certain viruses.
- D) Sputum specimens expected to contain Mycobacteria spp. [1]

2.3 The identification of mycobacteria with auramine O is due to:
- A) The affinity of the mycolic acid in the cell walls for the fluorochromes.
- B) The ability of mycobacteria to be excited through fluorescent light.
- C) Both A and B
- D) None of the above. [1]

2.4 a Positive result for a Cryptosporidium stain will be seen as:
- A) The oocysts stain light green.
- B) The oocysts stain dark blue.
- C) The oocysts stain from an intense red to dark pink.
- D) The oocysts stain an intense purple. [1]

2.5 Abnormal urine colour could be caused by:
- A) Foods
- B Medications
- C) Metabolic products
- D) All of the above [1]

2.6 Proteinuria can be defined as:
- A) Urinary protein excretion of > 150mg per day.
- B) Urinary protein excretion of < 150mg per day.
- C) Urinary protein excretion of 30 – 150 mg per day.
- D) Both A and C. [1]

2.7 The principal component responsible for the manifestations of endotoxin activity in patients with gram negative bacterial sepsis is
- A) The lipid A moiety
- B) The O somatic antigen
- C) The M-protein
- D) None of the above. [1]

2.8 Organisms with flagella over the entire cell surface are termed
- A) Peritrichous
- B) Amphi-lophotrichous
- C) Amphitrichous
- D) Lophotrichous

[1]

2.9 Organotrophic bacteria
- A) Use carbon dioxide as sole source of carbon.
- B) Synthesize its organic metabolites from carbon dioxide.
- C) Both A & B.
- D) Unable to use carbon dioxide as their sole source of carbon. [1]

2.10 A bacterial colony can be explained as:
- A) a Pile or mass of a sufficiently large number of cells.
- B) a Mass of cells growing on solid media.
- C) Bacterial pile on solid media, visible to the naked eye.
- D) All of the above. [1]

SECTION B (40)

QUESTION 3 [18]

3.1 Identify the factors influencing the quality of a microbial investigation. [6]

3.2 Match the following words with the relevant definition: **(1 mark each)**

3.2.1	Pathogen	A)	An animal infectious disease transmitted to humans.
3.2.2	Commensalism	B)	A micro-organism which can cause disease
3.2.3	Zoonosis	C)	Microbe benefits while human is unaffected.
3.2.4	Virulence	D)	Influenced by a variety of microbial factors.

[4]

3.3 Appraise the use of negative staining techniques. [4]

3.4 Compare sterilization and decontamination in table format. [2]

3.5 Point out the use of the oil in oil microscopy. [2]

QUESTION 4 [22]

4.1 Summarize the general purpose of stains in the diagnostic microbiology laboratory. [3]

4.2 Define the principle of the gram stain. [4]

4.3 Propose possible conditions when a patient is diagnosed with proteinuria. [4]

4.4 Match the following: **(1 mark each)**

4.4.1	Red cell casts	A)	Found in end-stage kidney disease.
4.4.2	Broad granular casts	B)	Means increased proteinuria or renal excretion of cells.
4.4.3	White cell casts	C)	Seen in active glomerulonephritis.
4.4.4	Cylindruria	D)	Seen in pyelonephritis. [4]

4.5 Calculate the cell count per ml of fluid (show all calculations):
You've counted 43 cells in 5 big squares, making use of a 5x diluted specimen.
(Big square area = $1mm^2$ and dept of 0.1mm) [5]

4.6 Outline some functions of the glycocallyx. [2]

SECTION C (55)

QUESTION 5 [20]

5.1 A Biomedical Scientist in the microbiology laboratory does a gram stain on an unknown culture.
The gram result is unexpectedly negative.

5.1.1 Propose a step-by-step way to confirm that the organism is gram negative. [5]

5.1.2 Explain the reaction obtained. [3]

5.2 Discuss the principle of the bile aesculin agar? [6]

5.3 Compare dry heat and moist heat as a physical means of controlling micro-organisms. [2]

5.4 An Intern Biomedical Scientists needs to do an oxidase test on a micro-organism under your supervision. You need to advise the Scientist on how to perform this test to make sure he gets accurate results. What advise will you give to the scientist? [4]

QUESTION 6 [35]

6.1 Judge the effectiveness of bacterial lyophilisation and summarize the process. [4]

6.2 Compare the different ways of milk pasteurization. [8]

6.3 Propose possible ways in which chemical agents used in the laboratory can cause bacterial death. [4]

6.4 Explain the possible plate methods of evaluating the effectiveness of a chemical agent. [9]

6.5 Illustrate the expected positive reactions on a DNAse agar and explain both the positive and negative reactions that could be seen on a DNAse agar plate. [10]

TOTAL : 120 MARKS