



**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: MMB621S	COURSE NAME: MEDICAL MICROBIOLOGY 2B
SESSION: January 2023	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Excluding this front page)

SECTION A (25)**QUESTION 1** [10]

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

- 1.1 Sources of error that needs to be consider for the Citrate utilisation test includes:
A) a light inoculum.
B) an excess of oxygen.
C) the incubation time of the test.
D) a heavy inoculum. [1]
- 1.2 Mycoplasma can be defined as:
A) a gram-negative bacillus.
B) an intracellular parasite.
C) the smallest self-sufficient bacteria.
D) a common causative organism of eye infections. [1]
- 1.3 Bacterial cross-resistance refers to:
A) Resistance constantly expressed.
B) One change that result in resistance to several drugs.
C) Resistance expressed when micro-organism is exposed to a specific drug.
D) Resistance expressed by an entire population. [1]
- 1.4 Durham tubes are used in microbiology in order to:
A) Interpret the ability of a specific organism to produce gas.
B) Interpret carbohydrate utilization by a specific organism.
C) Interpret the ability of a specific organism to change the pH of media.
D) Interpret whether an organism ferments or oxidize a carbohydrate. [1]
- 1.5 *N. asteroides* and *A. israelii* can be distinguished by means of:
A) Gram stain reaction.
B) Ziehl-Neelson reaction.
C) Albert stain reaction.
D) Capsular stain reaction. [1]
- 1.6 Bacterial antigens associated with motile organisms are:
A) K antigens
B) H antigens
C) O antigens
D) K and O antigens [1]
- 1.7 The sample required for diagnosing the causative organism for infective endocarditis is a:
A) nasopharyngeal swab.
B) urine sample.
C) blood culture.
D) tissue biopsy. [1]

- 1.8 Novobiocin are used to distinguish between:
A) *Staphylococcus epidermidis* & *Staphylococcus saprophyticus*.
B) *Staphylococcus aureus* & *Staphylococcus saprophyticus*.
C) *Streptococcus* spp and *Staphylococcus* spp.
D) *Staphylococcus aureus* & *Staphylococcus epidermidis*. [1]
- 1.9 Virulence factors of *Streptococcus pyogenes* that aids the organism to escape host defense is(are):
A) The outermost capsule of hyaluronic acid.
B) Streptokinases A & B lyse.
C) Hyaluronidase.
D) All of the above. [1]
- 1.10 The Salmonellae Vi antigen:
A) Is an acidic polysaccharide antigen that overlay the O antigen.
B) Exhibit the property of diphasic variation
C) Are fimbria antigens
D) Are determined by the complete sugar sequence. [1]

QUESTION 2

[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**.

- 2.1 *Klebsiella pneumoniae* form mucoid non-lactose fermenting colonies on the MacConkey agar.
- 2.2 *S. saprophyticus* are the only causative organism of Toxic Shock Syndrome.
- 2.3 Aerotolerant organisms will grow scanty in air and good growth when anaerobic
- 2.4 OrthoNitroPhenyl- β -D-Galactopyranoside test detects β -galactosidase.
- 2.5 Human infections with *Brucella melitensis* are associated with cattle.
- 2.6 Gram negative, oxidase positive diplococci, are diagnostic for *Neisseria gonorrhoea* infections in female patients.
- 2.7 Bubonic plaque is associated with *Clostridium*.
- 2.8 Metronidazole has no effect against many anaerobes.
- 2.9 The anthrax toxin causes an increase in vascular permeability resulting in shock.

SECTION B**(36)****QUESTION 3****[16]**

3.1 Categorise the following drugs by means of its mechanism of action.

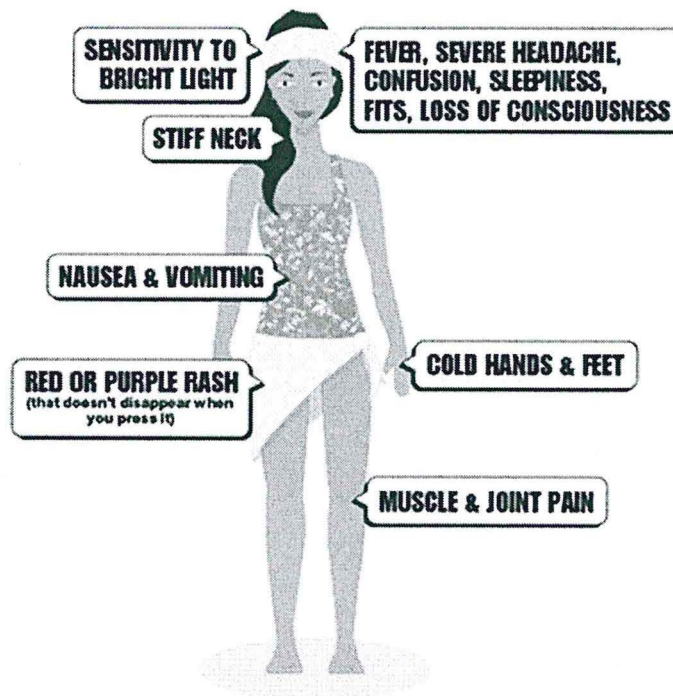
- | | |
|------------------|-----|
| A) Gentamycin | [1] |
| B) Metronidazole | [1] |
| C) Vancomycin | [1] |
| D) Ciprofloxacin | [1] |

3.2 Differentiate, in a table form, between *Bacillus anthracis*, *B. cereus* and *B. subtilis* using the following criteria:

- | | |
|----------------------------|------|
| A) Capsule, | |
| B) Motility, | |
| C) Catalase, | |
| D) Lecithinase production. | [12] |

QUESTION 4**[8]**

4. A patient is presenting with the following clinical symptoms from a suspected bacterial infection:



4.1 Point out what specimen should be collected to identify the causative pathogen?

[1]

4.2 Illustration, what you expect so see on the gram stain slide from the specimen?

[2]

- 4.3 Suggest tests which will enable you do to identify the organism, and give the expected results. [4]
- 4.4 Predict the expected pathogen responsible for the presented clinical symptoms. [1]

QUESTION 5 [12]

- 5.1 Justify and explain why the TPHA is considered a specific serological test. [4]
- 5.2 Summarize some of the mechanisms used by bacteria to resist the effects of antibiotics and give an example for each of the mentioned mechanisms. [8]

SECTION C (39)**QUESTION 6 [30]**

6. A patient is presenting with a very sore throat. The doctor submits a throat swab to your diagnostic medical microbiology laboratory.
- A) Discuss how you would go about processing this sample and justify your suggestions. [6]
- B) Identify the expected pathogen? [1]
- C) Illustrate, by means of a flow chart, how you would identify this organism. [9]
- 6.2 Present a positive satellitism test by means of a labelled illustration and explain the principle of the test. [9]
- 6.3 Propose factors affecting the quality of the final microbiological report, and explain why these factors affects the quality. [5]

QUESTION 7 [9]

- 7.1 Discuss the diagnosing typhoid fever in the microbiology laboratory. [9]

TOTAL: 100 MARKS