



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Faculty of Health and Applied Sciences

Department of Health Sciences

QUALIFICATION: BACHELOR OF MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	LEVEL: 6
COURSE: MEDICAL MICROBIOLOGY 2B	COURSE CODE: MMB621S
DATE: JANUARY 2020	SESSION:
DURATION: 3 HOURS	MARKS: 120

SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Ms Fredrika Engelbrecht
MODERATOR:	Prof Sylvester Moyo

INSTRUCTIONS	
<ol style="list-style-type: none">1. Answer all questions.2. Please write neatly and legibly.3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.4. No books, notes and other additional aids are allowed.5. Mark all answers clearly with their respective question numbers.	

Permissible material

Non programmable calculator is allowed.

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

SECTION A (27 MARKS)	
QUESTION 1	[10]
<p>Evaluate the statements in each numbered section and select the most appropriate answer or phrase from the given possibilities. Write the appropriate letter next to the number of the statement/phrase.</p>	
<p>1.1 The reverse CAMP test is used for the identification of:</p> <p>A) <i>Clostridium tetani</i>. B) <i>Clostridium perfringens</i>. C) <i>Clostridium difficile</i>. D) <i>Clostridium botulin</i>.</p>	(1)
<p>1.2 The cytokines released during an infection with <i>S. typhi</i> results in:</p> <p>A) Leucocytosis. B) Inflammatory reaction in the Peyer's patches. C) Spread of the organism to the mesenteric lymph nodes. D) Bacteraemia.</p>	(1)
<p>1.3 The causative organism of Lyme disease is:</p> <p>A) <i>Leptospirosis icterohaemorrhagie</i>. B) <i>Treponema pallidum</i>. C) <i>Borrelia burgdoferi</i>. D) <i>Borrelia recurrentis</i>.</p>	(1)
<p>1.4 The virulence factors of <i>Shigella dysenteriae</i> that is associated with the diarrhoeal symptoms are known as:</p> <p>A) The shiga toxin. B) The invasion plasmid antigens B and C. C) The intercellular A and B proteins. D) Enterotoxins.</p>	(1)
<p>1.5 <i>Rickettsia rickettsii</i> is the causative organisms of:</p> <p>A) Rocky Moutain spotted fever. B) Murine typhus. C) Boutonneuse fever. D) Epidemic typhus.</p>	(1)
<p>1.6 The following organism is known to cause pharyngitis:</p> <p>A) <i>H. ducreyi</i>. B) <i>Mycoplasma</i> spp. C) <i>P. aeruginosa</i>. D) Group A Streptococcus.</p>	(1)

<p>1.7 Which of the following drugs form part of the 2nd generation cephalosporins:</p> <p>A) Cefamandole & cefaclor. B) Cephalothin & cefazolin. C) Amikacin, & streptomycin. D) Ceftriaxone & cefotaxime.</p>	(1)
<p>1.8 The following organism ferment lactose when grown on MacConkey agar</p> <p>A) <i>N. meningitidis</i>. B) <i>E. coli</i>. C) <i>P. aeruginosa</i>. D) <i>Proteus mirabilis</i>.</p>	(1)
<p>1.9 The Salmonellae Vi antigen:</p> <p>A) Is an acidic polysaccharide antigen that overlay the O antigen. B) Exhibit the property of diphasic variation. C) Is fimbrial antigens. D) Is determined by the complete sugar sequence.</p>	(1)
<p>1.10 The causative organism of tick bite fever is:</p> <p>A) <i>Treponema pallidum</i>. B) <i>Chlamydia trachomatis</i>. C) <i>Ureaplasma species</i>. D) <i>Rickettsia connori</i>.</p>	(1)
<p>QUESTION 2</p>	[10]
<p>Assess the following statements and decide whether they are true or false. Write only the number of the question and TRUE for a true statement or FALSE for a false statement next to the number of the question. IF the statement is FALSE, please give a reason why you think it is false.</p>	
<p>2.1 <i>C. diphtheria</i> is only pathogenic when it is infected with the tox gene via a bacteriophage.</p>	
<p>2.2 <i>Bacillus</i> species is cause infectious and are always harmful to society.</p>	
<p>2.3 Citrate utilization should be incubated anaerobically for accurate results.</p>	
<p>2.4 <i>Bacteroides fragilis</i> is an aerobic organism usually responsible for conjunctivitis.</p>	
<p>2.5 <i>Clostridium perfringens</i> is the causative organism of Bubonic plaque.</p>	
<p>2.6 The anthrax toxin causes an increase in vascular permeability resulting in shock.</p>	

QUESTION 3

[7]

3.1 Pictures of specimen A and B below were taken from a low power microscopic field.
Evaluate the quality of the respiratory specimens seen on slides A and B, and explain your answer.

(6 x ½ = 3)



Specimen A



Specimen B

3.2 Match the following organisms with their associated disease.

- | | | |
|--|----|---|
| 3.2.1 Enterotoxigenic <i>E.coli</i> | A) | Bloody diarrhoea in all ages. |
| 3.2.2 Vero cytotoxin-producing <i>E.coli</i> | B) | Dysentery-like disease in all ages. |
| 3.2.3 Enteroinvasive <i>E.coli</i> | C) | Diarrhoea in infants, rarely in adults. |
| 3.2.4 Enteropathogenic <i>E.coli</i> | D) | Infant and adult watery diarrhoea |

(4)

SECTION B (29 MARKS)

[29]

QUESTION 4

4.1 Discuss how you will handle a positive blood culture, once the blood culture machine has flagged it as being positive.

(5)

4.2 Outline the main criteria used for bacterial identification.

(10)

4.3 Discuss the transmission of Epidemic typhus.

(8)

4.4 Explain the step-by-step procedure for diagnosing typhoid fever.

(6)

SECTION C (64 MARKS)		[28]
QUESTION 5		
5.1 Compare the pathogenesis and clinical manifestations of primary and secondary syphilis.		(10)
5.2 Distinguish in a table format between <i>C. perfringens</i> and <i>C. tetani</i> using the following criteria:		
A) Gram reaction and microscopic morphology.		
B) Spore.		
C) Motility.		
D) Lecithinase production.		
E) Indole production.		
F) Glucose fermentation.		
G) Lactose fermentation.		
H) Maltose fermentation.		(18 x ½= 9)
5.3 A doctor requests a diagnosis for Cholera.		
A) What specimen from the patient would you ask the doctor to submit?		(1)
B) Suggest the culture media and incubatory conditions required to grow the suspected pathogen causing Cholera?		(3)
C) Explain what you would expect to see if you have a positive growth on the culture media and justify why you would see this growth.		(2)
D) What is the causative agent of Cholera?		(1)
E) Describe the gram characteristics of the expected pathogen causing Cholera.		(2)

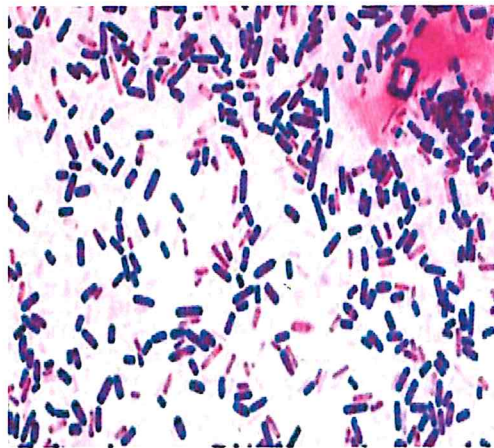
QUESTION 6

[36]

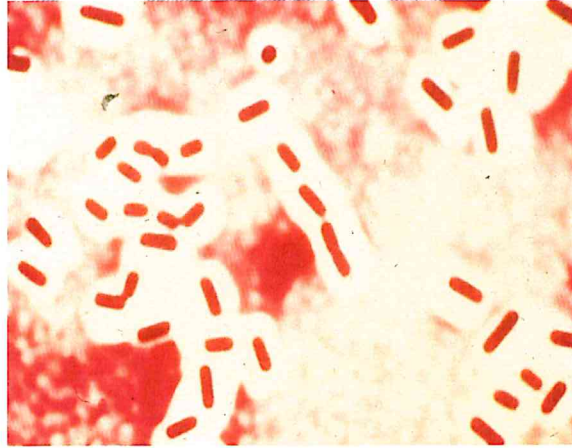
6.1

A 44-year-old male developed gas gangrene following an open fracture. Bacteriological studies of the case and the results are presented together with the clinical pictures. Despite adequate treatment of the open fracture of his right femur and tibia, he developed gas gangrene with typical signs such as severe myonecrosis, subcutaneous vesicles and crepitus, erythematous changes of the skin and with symptoms of toxemia. Gram stained smears and cultures of the exudate and tissue fragments from the lesion yielded the following results.

Gram stained slide:



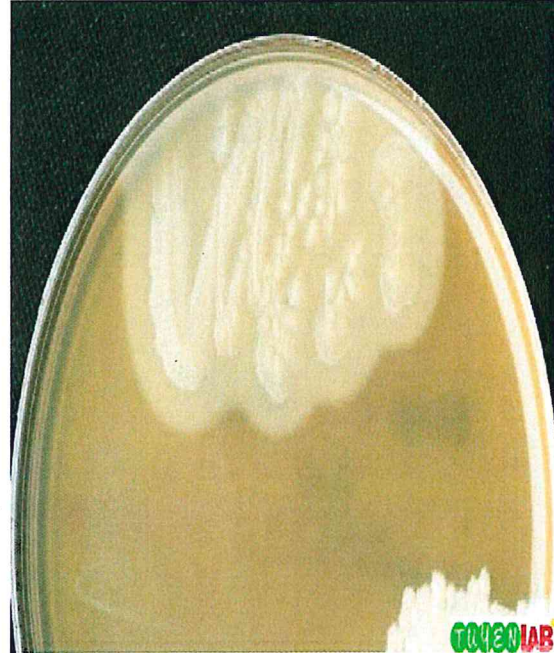
India ink stain:



Anaerobic Growth on blood agar:



Growth on Egg Yolk agar:



- A) Analyse and interpret the information received for this case study, and use it to identify the causative pathogen in this case.
- B) Justify how you've identified the pathogen in A.

(2)
(8)

<p>6.2 Assess the virulence factors of <i>B. pertussis</i> and discuss how it causes clinical symptoms in the patient.</p>	<p>(10)</p>
<p>6.3 A patient is presenting with a very sore throat. The doctor submits a throat swab to the diagnostic medical microbiology laboratory.</p> <p>A) Discuss how you would go about processing this sample and justify your suggestions.</p> <p>B) Name the expected pathogen?</p> <p>C) Illustrate, by means of a flow chart, how you would identify this organism.</p>	<p>(6)</p> <p>(1)</p> <p>(9)</p>
<p>END OF PAPER</p>	