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Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 1, 2019				

SBI282 – Clinical Microbiology 1	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes
INSTRUCTIONS TO CANDIDATES		
<p>This examination has THREE sections.</p> <p>Section A: 30 marks- marks for each question are of equal value Suggested time: 40 minutes Multiple Choice Questions: Answer ALL 30 questions on the multiple choice answer sheet provided</p> <p>Section B: 60 marks- marks for each question are NOT of equal value Suggested time: 80 minutes Short Answer Questions: Answer all 16 questions in the Answer Booklet provided</p> <p>Section C: 30 marks- marks for each question are of equal value Suggested time: 50 minutes Short Essay Questions: Answer all 3 questions in the Answer Booklet provided</p> <p>Total marks for this examination: 120</p>		
EXAM CONDITIONS		
<p><u>You may begin writing from the commencement of the examination session.</u> The reading time indicated above is provided as a guide only.</p>		
This is a CLOSED BOOK examination		
Any non-programmable calculator is permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED	
No additional printed material is permitted	1 x 20 Page Book 1 x 4-Multiple Choice Answer Sheet 2 x Scrap Paper	

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DOUBLE-SIDED.**

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LEFT BLANK.**

Section A
Multiple Choice Questions
Total No of Marks for this Section: 30

This section should be answered on the Multiple Choice Answer Sheet provided. Please ensure that your name and student number have been written on the Multiple Choice Answer sheet and placed in the completed Answer Booklet.

Each question is worth 1 mark. Suggested time allocation for Section A: 40 mins

Section B
Short Answer Questions
Total No of Marks for this Section: 60

This section should be answered in the Answer Booklet provided.
Answer all 16 questions.

Marks for each question are indicated. Suggested time allocation for Section B: 80 mins

Question 1

Define what is meant by the term “facultative anaerobe”. Give two examples of bacteria which are facultative anaerobes.

(Marks: 4)

Question 2

McConkey agar is an example of a medium which is selective and differential. Explain the biochemical basis for both the selective and differential properties of the medium.

(Marks: 4)

Question 3

With reference to control of gene expression in bacteria, define the terms promotor, operator, and operon.

(Marks: 6)

Question 4

How many copies of the target sequence are there after 5 cycles of PCR if there were 3 copies of the sequence initially? Show your working.

(Marks: 2)

Question 5

Which of the following statements is correct?

- A. Sigma factor is a molecule which binds to RNA polymerase during the initiation of transcription
- B. Sigma factor is a molecule which binds to the 30S ribosome during the initiation of translation

(Marks: 2)

Question 6

Describe the specific role of a β -lactamase inhibitor, when combined with a β -lactam antibiotic to treat infections.

(Marks: 3)

Question 7

Match the diseases on the left with their causative organism on the right.

- | | |
|-------------------------------|-------------------------------------|
| A. Scarlet fever | 1. <i>Treponema pallidum</i> |
| B. Peptic and duodenal ulcers | 2. <i>Burkholderia pseudomallei</i> |
| C. Syphilis | 3. <i>Streptococcus pyogenes</i> |
| D. Scrub typhus | 4. <i>Helicobacter pylori</i> |
| E. Melioidosis | 5. <i>Orientia tsutsugamushi</i> |

(Marks: 5)

Question 8

Name a bacterial species which is a gram positive coccus, catalase negative, α -haemolytic, and produces capsule.

(Marks: 2)

Question 9

Name two genera of medically important bacteria that are capable of producing endospores.

(Marks: 2)

Question 10

In terms of bacterial resistance to antimicrobial agents, explain what is meant by the term intrinsic resistance. Give one example of a bacterial species which is intrinsically resistant to a specific antimicrobial, name the antimicrobial agent it is resistant to, and explain the basis for the resistance.

(Marks: 4)

Question 11

Match the antimicrobial class on the left with an example of that class of agent on the right.

- | | |
|---------------------|------------------|
| 1. Tetracyclines | A. Cefazolin |
| 2. Macrolides | B. Ciprofloxacin |
| 3. Cephalosporins | C. Azithromycin |
| 4. Penicillins | D. Doxycycline |
| 5. Fluoroquinolones | E. Ampicillin |

(Marks: 5)

Question 12

The urea breath test is used in the diagnosis of which bacterial infection?

(Marks: 2)

Question 13

Define what is meant by the term endotoxin. Explain the composition and other key characteristics of this type of toxin.

(Marks: 4)

Question 14

Describe the key differences between the lysogenic and lytic cycles of bacteriophages.

(Marks: 6)

Question 15

Compare and contrast the key features of two different forms of food borne illness caused by *Bacillus cereus*. Include information regarding the pathogenic mechanisms and key symptoms.

(Marks: 6)

Question 16

Name three species of medically important obligate intracellular bacteria

(Marks: 3)

Section C
Short Essay Questions
Total No of Marks for this Section: 30

This section should be answered in the Answer Booklet provided.
Answer all 3 questions.

Each question is worth 10 marks. Suggested time allocation for Section C: 50 mins

Question 1

The Enterobacteriaceae are a large heterogeneous family of bacteria.

- (a) State the key diagnostic laboratory stain and test results that would indicate an Enterobacteriaceae species.
- (b) Name three bacterial species of the Enterobacteriaceae that are medically important, and provide details of the key pathogenic features of a disease that one of these species can cause.

(Marks: 10)

Question 2

Explain what it meant by the terms sterilisation, disinfection, and antisepsis. For each term, give an example of a situation in which it could be applied, discussing the key considerations for the choice, and providing two specific methods which could be used to achieve it.

(Marks: 10)

Question 3

Name two diseases caused by bacterial species of the genus *Neisseria*. For each disease, name the causative species, the pathogenic mechanisms involved, and the main clinical presentation of the disease.

(Marks: 10)