UNIVERSITY EXAMINATIONS

OCTOBER/NOVEMBER 2021

HOMEMYEXM

MIB3702

Advanced Microbial genetics, Recombinant DNA Technology and Industrial Microbiology

100 Marks

2H30Min

This paper consists of THREE (3) pages.

Instructions:

- This is a timed take-home examination.
- You will require a PC, laptop, or tablet. Smartphones can be used to photograph (scan) hand-written pages and collate into a file for upload and as Wi-Fi hotspots for connectivity.
- You have **2 hours, 30 minutes** to answer all the required questions.
- You will be given an additional 15 minutes to download the question paper and 60 minutes to upload the answer file.
- Clearly indicate your student number and all the required information on the front page of your answer sheet.
- Read each question carefully before you answer and take note of the mark allocation per question to determine how comprehensive your answer should be.
- Make sure your writing is neat and easy to read.
- You must upload your answer scripts in a single PDF file (answer scripts must not be password protected or uploaded as “read only” files).
- NO emailed scripts will be accepted.
- You are advised to preview submissions (answer scripts) to ensure legibility and that the correct answer script file has been uploaded.
- You are permitted to resubmit your answer scripts should the initial submission be unsatisfactory.
- Incorrect file format and uncollated answer scripts will not be considered.
- Incorrect answer scripts and/or submissions made on unofficial examinations platforms (including the invigilator cellphone application) will not be marked and no opportunity will be granted for resubmission.
- Mark awarded for incomplete submission will be the student’s final mark. No opportunity for resubmission will be granted.
- Mark awarded for illegible scanned submission will be the student’s final mark. No opportunity for resubmission will be granted.
- Submissions will only be accepted from registered student accounts.
- Students who have not utilised invigilation or proctoring tools will be subjected to disciplinary processes (only include if applicable to your module invigilated).
- Students suspected of dishonest conduct during the examinations will be subjected to disciplinary processes. UNISA has a zero tolerance for plagiarism and/or any other forms of academic dishonesty.
- Students are provided one hour to submit their answer scripts after the official examination time. Submissions made after the official examination time will be rejected by the examination regulations and will not be marked.
- Students experiencing network or load shedding challenges are advised to apply together with supporting evidence for an Aegrotat within 3 days of the examination session.
- Students experiencing technical challenges, contact the SCSC 080 000 1870 or email Examenquiries@unisa.ac.za or refer to Get-Help for the list of additional contact numbers. Communication received from your myLife account will be considered.

To download and submit the take home exam via myExams, follow the following steps:

a) Access myExams at https://myexams.ac.za/portal and login using your student number and myUnisa password.

b) Go to your specific examination site through the site tabs on the horizontal navigation bar. Also check your sites link in the top right-hand corner if you do not find the site on the horizontal navigation bar.

c) Once the site has loaded, select the eAssessment tool from the left-navigation menu. The list of all available assessments in the site will be displayed

d) Select the assessment for which you want to download/upload the examination answer file by clicking on the title of the assessment in the list. A new page will open.

e) Submit your examination answer file (PDF).

Instructions for The Invigilator App

- Please log into The Invigilator App. You need to be connected to the internet in order to log in and scan the QR code.
- Scan the QR code below as soon as you have downloaded your question paper during the 15-minute download window. Please take note that you can only scan the QR code for a limited time and it should therefore be scanned as soon as possible to start the invigilation.
- If you encounter difficulty with scanning of the QR code you can also enter the QR access code at the bottom of the QR code in order to start the assessment.
- Once the QR code is scanned, you can place your smartphone next to you. The Invigilator App will notify you when an action is required. Ensure your media volume Is turned up.
- You may access your MyExams in the application if you only have one device by pressing the 'access LMS' button.
- Please remember to keep your smartphone on charge for the duration of the assessment.
- Keep The Invigilator app open on your cell phone during the assessment. You are not allowed to leave or minimise the application.
- When an action is required, a notification beep will be heard. Action the request.
- Please ensure you are connected to the internet in order to commence the examination as well as at the end of the examination. No internet connection is needed during the assessment.
- It is important to first upload your script to the MyExams. Uploading of app data is not time sensitive and you can do it after you have uploaded your script to the MyExams.
- It is important to note that you have to adhere to the time limit in your MyExams assessment as the invigilation time in the app could exceed the time allocated to complete your assessment.
- You can click the "Finish Assessment" button in the app if you finish early.
- Should you encounter any technical difficulty, please WhatsApp The Invigilator Helpdesk on 073 505 8273.

Good Luck!

QR Access Code: 1127ce2d

QUESTION 1 **[25]**

1.1 The Human immunodeficiency virus contains an RNA genome. **Identify** the PCR technique you would employ to amplify a desired gene from this RNA virus and **support** your answer? (5)

1.2 Outline the principle for the PCR technique identified in 1.1 (10)

1.3 Explain how you would monitor disease progression and therapy response from an AIDS patient using quantitative (q) PCR (10)

QUESTION 2 **[35]**

2.1 During the adenoviral SARS-CoV2 vaccine development process, the plasmid encoding the Spike protein is generated. **Elaborate** on the steps you would follow to generate a recombinant plasmid encoding the Spike protein (15)

2.2 Explain how you would use the blue-white colony screening technique to identify bacteria containing the recombinant plasmid (10)

2.3 Comment on the possible applications of recombinant DNA technology and their impact on society (10)

QUESTION 3 **[20]**

Write explanatory notes on the following:

3.1 The role of microbiology in producing potable water (10)

3.2 How adherence to Hazard Analysis Critical Control Point (HACCP) in the food production industry would curb foodborne disease outbreaks (10)

QUESTION 4 **[20]**

Constructed wetlands are now highly preferred systems for improving the quality of point and nonpoint sources of water pollution including sewage, stormwater runoff or industrial wastewater. Give a **detailed description** of the main features and processes that facilitate removal of pollutants from surface water passing through a wetland

TOTAL MARKS: 100

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SECOND EXAMINER: **Prof. S Meddows-Taylor**
EXTERNAL EXAMINER: **DR. M Le Roux**

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