Tutorial letter 101/3/2016

Molecular Biology

BMI2604

Semesters 1 & 2

Department of Life and Consumer Sciences

IMPORTANT INFORMATION:

This tutorial letter contains important information about your module.

BAR CODE

CONTENTS

Page

1 INTRODUCTION

Dear Student

Welcome to Biomedical Sciences and in particular this module BMI2604, Molecular Biology. This module is offered in the Department of Life and Consumer Sciences and your lecturer is Prof John Dewar. I would like to take this opportunity to wish you success with your academic year.

I would also like to encourage you to register on ***my*Unisa**. Check this site regularly for updates, posted announcements and additional resources uploaded throughout the semester. Rapid communications throughout the semester(s) have been made possible through *my*Unisa. You can use the *my*Unisa site to submit assignments and we strongly recommend that you submit your assignment online as this will ensure that you receive rapid feedback and comments, access your official study material, have access to the Unisa Library functions, 'chat' to your lecturers or to fellow students and participate in online discussion forums and obtain access to all manner of learning resources.

If at any stage while you are studying you have any questions or require assistance with problems, I am available to assist you. My contact details are listed in section 3: Lecturer(s) and contact details in this tutorial letter.

1.1 Study Material

These include:

- Tutorial Letter 101
- BMI2604 Study guide

Some of this tutorial matter may not be available when you register but will be posted to you as soon as possible. Note that this is also available on *my*Unisa ("Official Study Material" Tab).

Tutorial letter 101 is just one of the tutorial letters you should be receiving during the year.

PLEASE read the instructions in this tutorial letter carefully and prepare Assignments 01 and 02 ONLY for the semester for which you are REGISTERED. Once you have completed and submitted the assignments you can use the questions in the other assignments as practice or in preparation for the exam. **It is very important that your first assignment reaches Unisa on or before the due date.** Students who have not submitted this assignment by the due date will not be allowed to write the examination.

2 PURPOSE OF AND OUTCOMES FOR THE MODULE

2.1 Purpose

Qualifying students are able to know, understand and apply the principles and theory relating to molecular biology.

2.2 Outcomes

The student should be able to:

- explain cellular processes such as DNA replication, DNA repair, transcription, translation and regulation of gene expression

- discuss some modern molecular laboratory techniques and how they can be used to isolate and characterise DNA for further research
- describe some applications of molecular biology in biotechnology and medical diagnosis

3 LECTURER(S) AND CONTACT DETAILS

3.1 Lecturer(s)

Lecturer: Prof John Dewar

Telephone number: +27 11 471 3112 (during office hours 8:00 – 16:00)

Email address: dewarj@unisa.ac.za

Postal address:
The Lecturer (BMI2604)
Department of Life and Consumer Sciences
Private Bag x6
Florida
1710

NOTE: You may enclose more than one letter in an envelope, but do not address enquiries to different departments (e.g. Despatch and Library Services) in the same letter. This will cause a delay in the replies to your enquiries. Please write a separate letter to each department and mark each letter clearly for the attention of that department. **Letters to lecturers may not be enclosed together with assignments**. Always write your **student number and the module code** at the top of your letter.

3.2 Department

Department of Life and Consumer Sciences

Telephone number (Departmental Secretary): +27 11 471 2230

Fax number: +27 11 471 2796

3.3 University

Should you need to contact the university about matters not related to the content of this module, consult the publication *myStudies @ Unisa*, which you received with your study material. This brochure contains information on how to contact the university (e.g. to whom you can write for different queries, important telephone and fax numbers, addresses and details of the opening and closing times of particular facilities).

You can also make use of the following contact routes:
Unisa website http://www.unisa.ac.za & http://mobi.unisa.ac.za
Email (general enquiries) info@unisa.ac.za
International students are urged to make use of the email address info@unisa.ac.za
study-info@unisa.ac.za queries related to application and registration.
assign@unisa.ac.za for assignment enquiries
exams@unisa.ac.za for examination enquiries
despatch@unisa.ac.za for study material enquiries
finan@unisa.ac.za for student account enquiries
myUnisaHelp@unisa.ac.za for assistance with *my*Unisa
myLifeHelp@unisa.ac.za for assistance with myLife email accounts
SMS 32695 – South Africa only

You will receive an auto response SMS with the various SMS options. The cost per SMS is R1.00.
Fax 012 429 4150

NOTE: Whenever you contact the university, whether in writing or telephonically, always mention the **module code and your student number**.

***my*Unisa webpage (Unisa's online campus)**
Access to the *my*Unisa website requires a computer that is linked to the internet (internet access is available to you at provincial libraries, internet cafés and Unisa regional telecentres, see *my*Unisa for a list of these places in your area). You should also note that some of these centres allow free internet access on presentation of your student card.

Go to: https://my.unisa.ac.za/portal/
For module-specific information, log in and click on:
BMI2604-15-S1 (for semester 1)
OR
BMI2604-15-S2 (for semester 2).
With the aid of *my*Unisa, you will ultimately be able to use the internet to perform all study-related functions which are now normally done by telephone, regular postal service or personal visits to the campus.

If you have online access, you should do the following to get started with this module:

- Go to myUnisa (http://my.unisa.ac.za)
- Log in with your myUnisa login details. If you are not sure how to do this, consult the publication My studies @ Unisa. You should have received this with your study material. Alternatively, use the link to access the publication.)
- Once logged in, you will see a link to the module code. If this is not at the top of your screen, click on 'More sites' and select it from the drop-down menu.
- Once you are in the site for this module, read the welcome message.
- Now click on **Additional Resources**, then on the subfolder **Tutorial Matter**, and then on **Tutorial Letter 101**. Read this letter carefully.
- Go to the **learning units** and read **learning unit 0**.

If you are studying mainly from print, you can read Tutorial Letter 101 and learning unit 0 in your printed study pack.

Library
Unisa Library login
You will be required to provide your login details, i.e. your student number and your *my*Unisa password, in order to access the library's online resources and services. This will enable you to:
• Request library material.
• View and renew your library material.
• Use the library's e-resources.
The *myStudies @ Unisa* brochure, which is part of your registration package, lists all the services offered by the Unisa Library.

4 MODULE-RELATED RESOURCES

4.1 Prescribed books

The title of your prescribed textbook is:

Alberts, B, Johnson, A, Lewis, J, Raff, M, Martin, K & Walter, P. 2008. Molecular Biology of the Cell. New York: Garland Science. ISBN: 978-0-8153-4106-2.

Please refer to the list of official booksellers and their addresses in the *myStudies @ Unisa* brochure.

Prescribed books can be obtained from the University's official booksellers. If you have difficulty in locating your book(s) at these booksellers, please contact the Prescribed Book Section at Tel: 012 429-4152 or e-mail *vospresc@unisa.ac.za*.

This book also ought to be available at any of the official Unisa booksellers. If not, you can order it yourself on the Internet from:

http://amazon.com

http://www.kalahari.net

http://www.exclusivebooks.com

Second hand books are available at the following Web sites: http://www.amazon.com or http://www.fetchbooks.com. Please note that if you have access to an older edition of the prescribed textbook, please refer to the contents page of the study guide and then correlate this with the appropriate section in the textbook.

4.2 Recommended books

Any molecular biology textbooks

4.3 Electronic Reserves (e-Reserves)

There are no e-Reserves for this module. Announcements will be posted on *my*Unisa as and when required.

5 STUDENT SUPPORT SERVICES FOR THE MODULE

Important information appears in your *myStudies @ Unisa* brochure.

6 MODULE-SPECIFIC STUDY PLAN

Use your *myStudies @ Unisa* brochure for general time management and planning skills.

This is a semester module over 15 weeks and requires 120 hours of study time; this means that you will have to study 8 hours per week for this module. The following is a recommended time schedule which can be used as a guideline for studying this module.

ACTIVITY	HOURS
Reading and re-reading study guide	10
Reading relevant chapters in the prescribed textbook	35
Completing study guide activities	10
Studying for and completing the assignments	20
Studying for examination	40
Final revision	5
TOTAL	**120**

Please see an example below of how you can schedule your study plan:

Week	Activity (each week represents 8 hours of study time)
1	Read through your study material (you study guide and tutorial letter) and skim through your text book and identify the relevant chapters. This exercise allows you to gain an overall picture of the module.
2	
3	Read through your textbook, using your study guide, and identify all key areas.
4	
5	
6	Complete and submit Assignment 1. Depending on how you will submit the completed assignment, please note that you should allow sufficient time for the assignment to reach Unisa before the due date.
7	Begin with your in-depth study of the initial study units. Please prepare study notes whilst reading and learning the material. Start to complete your Assignment 2
8	
9	
10	Complete and submit Assignment 2. Depending on how you will submit the completed assignment, please note that you should allow sufficient time for the assignment to reach Unisa before the due date.
11	
12	Begin with your in-depth study of later study units. Please prepare study notes while reading and learning the material.
13	
14	
15	Revision and preparation for the exam.

7 MODULE PRACTICAL WORK AND WORK-INTEGRATED LEARNING

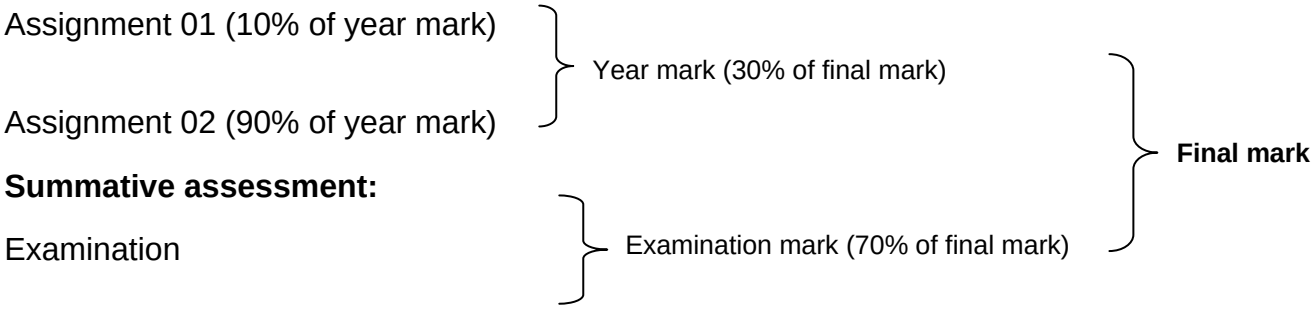
There are no practicals for this module.

8 ASSESSMENT

8.1 Assessment plan

Summary as to how your final mark will be calculated

Formative assessment:



8.2 General assignment numbers

Assignments are numbered consecutively per module, starting from 01

8.2.1 Unique assignment numbers

SEMESTER 1

Assignment 01: 821101
Assignment 02: 780632

SEMESTER 2
Assignment 01: 678823
Assignment 02: 652148

8.2.2 Due dates for assignments

SEMESTER 1

Assignment 01: 10th March 2016
Assignment 02: 11th April 2016

SEMESTER 2
Assignment 01: 8th August 2016
Assignment 02: 12th September 2016

8.3 Submission of assignments

Both the assignments are compulsory and must be submitted on or before the stipulated due date. **To receive quicker, online feedback and comments on your assignments submit your assignment electronically.** If you intend to post your assignment, please complete and post it at least **a week** before the due date to ensure that we receive it in time. Please note that failure to submit specifically Assignment 01 will result in your NOT being allowed admission to the examination. In exceptional circumstances, only a **valid** medical certificate associated with a valid long-term illness will be considered as a reason for the late submission of an assignment. In such a case, please notify the lecturer well in advance. Note that if no arrangements were made, the assignment will not be marked. Please attach the medical

certificate at the back of your assignment and ensure that you have certified copies of such a certificate.

For detailed information and requirements with regard to assignments, see the brochure entitled *myStudies @ Unisa*, which you received with your tutorial material.
Note: Prepare only the assignments for the semester for which you are registered.

Assignments may not be submitted by fax or email. You may submit written assignments and assignments completed on mark-reading sheets either by regular postal service **or** mobile MCQ submission **or** electronically via *my*Unisa. Make a copy of your assignment for your own reference and if the original is lost at any stage during the submission process.

Unisa is implementing onscreen marking of assignments to help you receive quicker feedback on your assignments. This will not be the case for all your modules, however, most modules from the Department of Life and Consumer Sciences can be marked this way.

To allow us to mark your assignment onscreen, you need to do the following:

1. Convert your electronic assignment to PDF format.
How do I create a PDF document from any other document format (e.g. MS Word, MS Excel etc.)?
By quickly downloading FREE software (namely PrimoPDF), you can create a PDF document from any type of document you can print. Follow these easy steps:

i. Go to the Internet to the following website: http://www.primopdf.com/index.aspx
ii. Download the PrimoPDF software by clicking on the **DOWNLOAD FREE** prompt. Follow the instructions for installing the software.
iii. To create a PDF document from your assignment, go to your assignment on your PC and instead of printing your assignment to an actual printer, choose PrimoPDF as printer. To do this, click on the **Microsoft Office Button**  (or 'File' button for older versions of Microsoft), and then click **Print**. Then, choose from the drop-down list the printer which in this case should be **PrimoPDF**).
iv. You will now receive a pop-up message. Click the "**Create PDF**" button. Indicate in the "**Save as:**" pop-up where you want to save the PDF assignment on your PC.
v. The PDF version of your assignment will now appear for your viewing.

2.Submit the PDF document (your assignment) via *my*Unisa (online). For guidance on how to submit an assignment via *my*Unisa, see section 8.4 of this tutorial letter **or** the *myStudies @ Unisa* brochure.

8.4 Assignments

Assignments are seen as part of the learning process for this module. As you complete the assignment, please study the reading text, consult other resources, discuss the work with fellow students or tutors or do research - you are actively engaged in learning.

There are TWO assignments for this module for each semester. You will find the assignments in this tutorial letter:

- **Semester 01** (January to June) in **Appendix A,** and
- **Semester 02** (July to December) in **Appendix B**.

The **due dates** are given with each assignment in Appendix A and B.

You will be provided with a mark-reading sheet for Assignment 01. Assignment 02 is a written assignment, **please ensure that you answer the questions in your own words, and do not copy directly from your textbook as this is plagiarism and marks will be deducted for plagiarism**. The information available in your study guide and prescribed textbook is sufficient to answer most of the questions in the assignment. We advise you to consult other textbooks and peer-reviewed literature from the library to improve your understanding of the different topics.

Both assignments are compulsory and must be submitted on or before the respective due dates. Failure to submit Assignment 01 will result in you not being admitted to the examination for the module. As seen in the "Assessment plan" section, both assignments are significant to your year mark and so if you do not submit Assignment 02 your year mark will be very low and you could, therefore, fail the module even if you pass your exam.

For detailed information and requirements with regard to assignments, see the brochure entitled *myStudies @ Unisa*, which you received with your tutorial material.
Note: Prepare only the assignments for the semester for which you are registered.

9 OTHER ASSESSMENT METHODS

Not Applicable.

10 EXAMINATION

Use your *myStudies @ Unisa* brochure for general examination guidelines and examination preparation guidelines.

This module is offered in a semester period of fifteen weeks. This means that if you are registered for the first semester, you will write the examination in May/June 2016 and the supplementary examination will be written in October/ November 2016. If you are registered for the second semester you will write the examination in October/November 2016 and the supplementary examination will be written in May/June 2017.

For examination admission it is compulsory for you to hand in the first assignment for this module. It is also to your own advantage to do the assignments in order to test your understanding of the subject, and to establish how well prepared you are for the examination. You need to obtain a minimum of 40% for your exam and if you do not obtain at least 40%, you will fail even if the combination of year and exam mark is more than 50%. You will also need a minimum of 40% in the examination to obtain admission to a supplementary examination. You require a final mark of 50% to pass this module. Please see the examples below:

- Exam mark below 40% will result in your failing this module.

- Exam mark 40% and Year mark 50% (combination of your first and second assignment marks) = A final mark of 43% - you will be allowed to write a supplementary exam.

  Calculated as:
  40 x 70% (0.70) = 28%
  50 x 30% (0.30) = 15%

- Exam mark 50% and Year mark 60% = A final mark of 53% - you will pass this module
  Calculated as:
  50 x 70% (0.70) = 35%
  60 x 30% (0.30) = 18%

As you can see from these examples it is important to obtain a minimum of 40% for your exam, as well as submitting both your assignments and work hard to obtain a good year mark to ensure that you pass the module.

You will have the opportunity to give an account of your studies in a two-hour examination paper (per module). You will be informed by letter of the dates, places and venues of the examinations. Examination guidelines, posted on myUnisa will give you pointers as to how to prepare for the examination. Revision should be done thoroughly before the examination. Contact us immediately, preferably by direct email, if you encounter any problems. Students can also refer to the *myStudies @ Unisa* brochure for general examination guidelines and examination preparation guidelines. The examination paper is a two (2) hour examination and consists of questions such as those requiring you to provide definitions of terms, draw labelled diagrams as well as answering short and longer essay questions.

11 FREQUENTLY ASKED QUESTIONS

The *myStudies @ Unisa* brochure contains an A-Z guide of the most relevant study information.

12 SOURCES CONSULTED

Not Applicable

13 CONCLUSION

Good luck and enjoy your studies.

14 ADDENDUM

Appendix A – Assignments for the first semester

Appendix B – Assignments for the second semester

APPENDIX A: FIRST SEMESTER COMPULSORY ASSIGNMENTS

Department of Life and Consumer Sciences

Molecular Biology

BMI2604

Semester code: 01

Assignment 01

DUE DATE: 10th March 2016

Unique assignment number: 821101

INSTRUCTIONS

1) Assignment 01 contains only multiple-choice questions (MCQ). Use the mark-reading sheet provided to answer these questions.

2) Fill in all your **personal details** on the mark reading sheet.

3) Indicate the correct answer clearly by shading in the appropriate number on the mark reading sheet with an **HB pencil**. If more than one number is shaded in any answer, NO marks will be awarded for that question.

4) See the *myStudies @ Unisa* booklet for more detailed information on filling in mark reading sheets

Assignment 1: Multiple choice questions 2 x 10 = **[20]**

The purpose of this assignment is to familiarise yourself with the study material content by means of techniques designed to **improve your study skills**. **Take note** that you will have to consult your **textbook** as well as the study guide to answer Assignment 01.

After reading the sections in your study guide, answer the questions below.

1. How many common amino acids are found in proteins?

    1. 5
    2. 20
    3. 17
    4. 80
    5. An infinite number

2. The following terms are associated with prokaryotes EXCEPT …… .

    1. nucleus
    2. ribosomes
    3. peptidoglycan
    4. cell wall
    5. membranes

3. The following terms are associated with eukaryotic genes EXCEPT…….. .

    1. expression
    2. chromosomes
    3. DNA
    4. heterozygous
    5. reverse transcription

4. The following are associated with the synthesis of DNA EXCEPT ……. .

    1. DNA gyrase
    2. primer pairs
    3. polymerase
    4. nucleotides triphosphates
    5. replicative intermediates

5. The synthesis of mRNA from a DNA template is called …… .

    1. DNA replicon
    2. translation
    3. transcription
    4. replication
    5. restriction

6. Which of the following enzymes synthesises RNA using DNA as a template?

    1. DNA gyrase
    2. DNA polymerase
    3. RNA polymerase
    4. RNA ligase
    5. RNAse

7. Which part of the tRNA molecule binds to the mRNA molecule during translation?

    1. anticodon
    2. amino acid
    3. 5’ end
    4. binding loop
    5. codon

8. Molecular biology techniques include the following EXCEPT ……. .

    1. PCR
    2. western blotting
    3. flow cytometry
    4. solvent extraction
    5. ELISA

9. Terms associated with the cell cycle include the following EXCEPT……. .

    1. apoptosis
    2. M and S phases
    3. necrosis
    4. mucosis
    5. growth factors

10. PCR can be used to routinely amplify a specific region of DNA from the following samples EXCEPT…… .

    1. hair follicle
    2. blood
    3. skin cells
    4. plasmid DNA
    5. petrified material

TOTAL MARKS [20]

END OF ASSIGNMENT 01

Department of Life and Consumer Sciences

Molecular Biology

BMI2604

Semester code: 01

Assignment 02

DUE DATE: 11th April 2016

Unique assignment number: 780632

INSTRUCTIONS

1) Preferably type your assignment on a computer. Please use 1,5 spacing and Arial or a similar font of 11 or 12 pitch. Leave a line open between questions. We will not mark a typed assignment that does not comply with these requirements. If you could not type your assignment, use a black or blue pen and please write neatly.

2) Use the assignment cover and envelope provided. When stapling your answers inside the cover, staple only in the top left-hand corner.

3) Your student number is the number just below your address. This number must be filled in on the assignment cover and must also be quoted in all correspondence with the university.

4) Answer all questions as briefly and clearly as possible.

5) Formulate the answers in your **OWN WORDS and do not copy directly from your textbook, as this is plagiarism and marks will be deducted for plagiarism.**

6) Number your answers correctly.

The purpose of this assignment is to work through the study material content and to introduce you to answering essay type questions (as you will come across similar types of questions in your exam). **Take note** that you will have to consult your **textbook** as well as the study guide to answer Assignment 02.

Question 1 **[20]**

Describe reagents you require to perform cloning experiments and show how you would prepare cDNA and a cDNA library

Question 2 2 x 10 = **[20]**

Define or explain the following molecular biology terms:

a) nuclease
b) phosphodiester bond
c) RNA splicing
d) ribozyme
e) cristae
f) apoptosis
g) sliding clamp
h) sigma factor
i) intron
j) helicase

Question 3 **[20]**

Describe the events and active enzymes involved in DNA replication.

Question 4 **[20]**

Describe in detail the translation process.

Question 5 **[20]**

With the aid of simple diagrams, show how an RNA sequences can give rise to different amino acid sequences.

Question 6 **[20]**

Discuss the principles behind the following molecular techniques:

a) gel electrophoresis (5)
b) PCR (5)
c) DNA sequencing (5)
d) ELISA (5)

Question 7 **[20]**

7.1 Discuss various DNA repair mechanisms (10)

7.2 Discuss why it is important to a virus such as HIV that RNA polymerases do not have a proofreading ability. (10)

Question 8 **[20]**

Discuss what you consider to be important techniques and instruments that should be located in a modern molecular diagnostic laboratory. Describe in detail the theory and practice of four of these techniques.

Question 9 **[20]**

Discuss in detail a cloning experiment to express a product such as insulin.

TOTAL MARKS [180]

END OF ASSIGNMENT 02

APPENDIX B: SECOND SEMESTER COMPULSORY ASSIGNMENTS

Department of Life and Consumer Sciences

Molecular Biology

BMI2604

Semester code: 02

Assignment 01

DUE DATE: 8th August 2016

Unique assignment number: 678823

INSTRUCTIONS

1) Assignment 01 contains only multiple-choice questions (MCQ). Use the mark-reading sheet provided to answer these questions.

2) Fill in all your **personal details** on the mark reading sheet.

3) Indicate the correct answer clearly by shading in the appropriate number on the mark reading sheet with an **HB pencil**. If more than one number is shaded in any answer, NO marks will be awarded for that question.

4) See the *myStudies @ Unisa* booklet for more detailed information on filling in mark reading sheets.

Assignment 1: Multiple choice questions 2 x 10 = **[20]**

The purpose of this assignment is to familiarize yourself with the study material content by means of techniques designed to **improve your study skills**. **Take note** that you will have to consult your **textbook** as well as the study guide to answer Assignment 01.

After reading the sections in your study guide, answer the questions below.

1. The following are common features of the central dogma, EXCEPT ……..... .

    1. DNA
    2. RNA
    3. proteins
    4. vitamins
    5. primers

2. The following are associated with acids, bases and buffers, EXCEPT …… .

    1. pH
    2. pI
    3. pKa
    4. pKb
    5. p2

3. The following are macromolecular subunits, EXCEPT ……. .

    1. amino acids
    2. nucleotides
    3. fatty acids
    4. histones
    5. nucleoside triphosphates

4. The following are associated with cellular metabolism, EXCEPT…… .

    1. ATP
    2. protabolism
    3. anabolism
    4. catabolism
    5. energy

5. The following are closely associated with DNA, EXCEPT ……. .

    1. methylation
    2. binding proteins
    3. exons
    4. translation
    5. transcription

6. The following are associated with healthy cell growth, EXCEPT ……. .

    1. medium
    2. intact membranes
    3. lysis
    4. tissue culture
    5. enumeration

7. The following are associated with cancer cells, EXCEPT ……. .

    1. telomerase
    2. differentiation
    3. transformation
    4. immortality
    5. melanoma

8. The following may be associated with chromatography, EXCEPT …….. .

    1. PCR
    2. thin layer
    3. gas
    4. liquid
    5. affinity

9. The following are associated with electrophoresis, EXCEPT …….. .

    1. PAGE
    2. AGE
    3. exchange
    4. 2-D
    5. SDS

10. The following are associated with cloning, EXCEPT…….. .

    1. expression
    2. vectors
    3. transfection
    4. FACS
    5. PCR

TOTAL MARKS [20]

END OF ASSIGNMENT 01

Department of Life and Consumer Sciences

Molecular Biology

BMI2604

Semester code: 02

Assignment 02

DUE DATE: 12th September 2016

Unique assignment number: 652148

INSTRUCTIONS

1) Type your assignment on a computer. You may print on ordinary white paper and not necessarily the Unisa typing paper provided. Please use 1,5 spacing and Arial or a similar font of 11 or 12 pitch. Leave a line open between questions. We will not mark a typed assignment that does not comply with these requirements. If you could not type your assignment, use a black or blue pen and please write neatly.

2) Use the assignment cover and envelope provided. When stapling your answers inside the cover, staple only in the top left-hand corner.

3) Your student number is the number just below your address. This number must be filled in on the assignment cover and must also be quoted in all correspondence with the university.

4) Answer all questions as briefly and clearly as possible.

5) Formulate the answers in your **OWN WORDS and do not copy directly from your textbook, as this is plagiarism and marks will be deducted for plagiarism.**

6) Number your answers correctly.

The purpose of this assignment is to work through the study material content and to introduce you to answering essay type questions (as you will come across similar types of questions in your exam). **Take note** that you will have to consult your **textbook** as well as the study guide to answer Assignment 02.

Question 1 **[20]**

Describe in detail the process of DNA replication.

Question 2 2 x 10 = **[20]**

Define or explain the following molecular biology terms:

a) gyrase
b) topoisomerase
c) polymerase
d) GC clamps
e) DNA restriction
f) ELISA
g) ribosomes
h) ligase
i) monoclonal antibodies
j) cloning

Question 3 **[20]**

Describe in detail the processes of transcription and translation.

Question 4 **[20]**

Discuss the regulation of gene expression.

Question 5: **[20]**

Discuss the following molecule biology techniques:

a) DNA cloning
b) PCR
c) ELISA
d) DNA sequencing

Question 6 **[20]**

Discuss the importance of “dark” DNA.

Question 7: **[20]**

Describe the importance of DNA proofreading and, for viruses such as HIV, the absence of proofreading by RNA polymerases.

Question 8 **[20]**

Describe the organelles within a normal eukaryotic cell.

Question 9 **[20]**

Discuss the cell cycle in normal and cancer cells.

TOTAL MARKS [180]

END OF ASSIGNMENT 02