



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE HONOURS	
QUALIFICATION CODE: 08BOSC	LEVEL: 8
COURSE NAME: BIOSYNTHETIC PATHWAYS AND MOLECULAR BIOLOGY	COURSE CODE: BPM821S
SESSION: NOVEMBER 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER	DR LAMECH MWAPAGHA
MODERATOR:	DR EMMANUEL NEPOLO

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.4. All written work MUST be done in BLUE or BLACK ink.

PERMISSIBLE MATERIALS

None

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

QUESTION 1 [16]

- a) Outline **FIVE (5)** factors you would consider when designing primers. (5)
- a) State **THREE (3)** prerequisite elements for biosynthesis (3)
- b) Describe the anabolic role of the TCA cycle in fatty acid synthesis. (8)

QUESTION 2 [15]

- a) Outline **FOUR (4)** characteristics of a genome database systems (4)
- b) Different G-alpha proteins have been known to activate different second messenger pathways. Briefly explain how GPCRs enable smooth muscle contraction via oxytocin signalling. (6)
- c) Describe the process of GPCR desensitization (5)

QUESTION 3 [15]

- a) Give **FIVE (5)** reasons why cancer staging is important? (5)
- b) Discuss how the coordination of the eukaryotic cell cycle phases is dependent on a series of cell cycle checkpoints. (10)

QUESTION 4 [16]

- a) Clinical research is one of the important steps in the drug development process. Outline **FOUR (4)** important factors considered by researchers before the commencement of this step. (4)
- b) Based on ADME properties, why is drug development a challenging task? (4)
- c) Describe the two pathways utilized by the body for the excretion of compounds once they have entered the bloodstream (8)

QUESTION 5

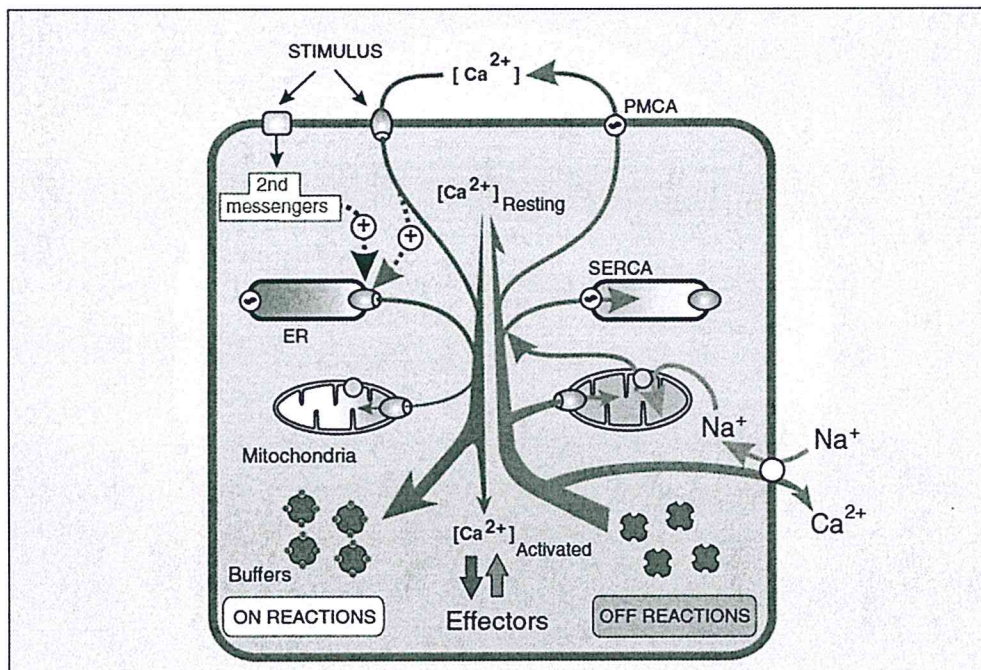
[12]

- a) Deduce why HeLa cells being cancer cells are useful for research into anything other than cancer? (2)
- b) Briefly describe the following hallmarks of cancer; (10)
- I. Enabling replicative immortality
 - II. Evading Immune Destruction
 - III. Tumour-promoting inflammation
 - IV. Sustaining proliferative signalling
 - V. Inducing angiogenesis

QUESTION 6

[14]

The signalling pathway below is responsible for multiple cellular processes that trigger new life at the time of fertilization.



- a) Name the signalling pathway (2)
- b) Briefly describe the activation of the signalling pathway (8)
- c) Outline **FOUR (4)** functions of the canonical Wnt signalling pathway (4)

QUESTION 7

[12]

- a) Outline **SEVEN (7)** reasons why cancer biomarkers are missing the mark in cancer prognosis and diagnosis (7)
- b) Give **FIVE (5)** contributions of Henrietta Lacks to modern medicine (5)

THE END