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OF SCIENCE AND TECHNOLOGY**

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QUALIFICATION : BACHELOR OF SCIENCE HONOURS	
QUALIFICATION CODE: 08BOSC	LEVEL: 8
COURSE: BIOSYNTHETIC PATHWAYS AND MOLECULAR BIOLOGY	COURSE CODE: BPM821S
DATE: NOVEMBER 2023	SESSION: 1
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY: QUESTION PAPER

EXAMINER: *PROF LAMECH MWAPAGHA*

MODERATOR: *DR EMMANUEL NEPOLO*

INSTRUCTIONS:

1. Answer all questions on the separate answer sheet.
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 MATERIALS:

1. None

This question paper consists of four (4) pages including this front page.

Question 1

[12]

a) Define the following terminologies:

(4)

I. Federated database:

II. Juxtacrine Signalling:

III. High-throughput genome database:

IV. Hyperchromatic:

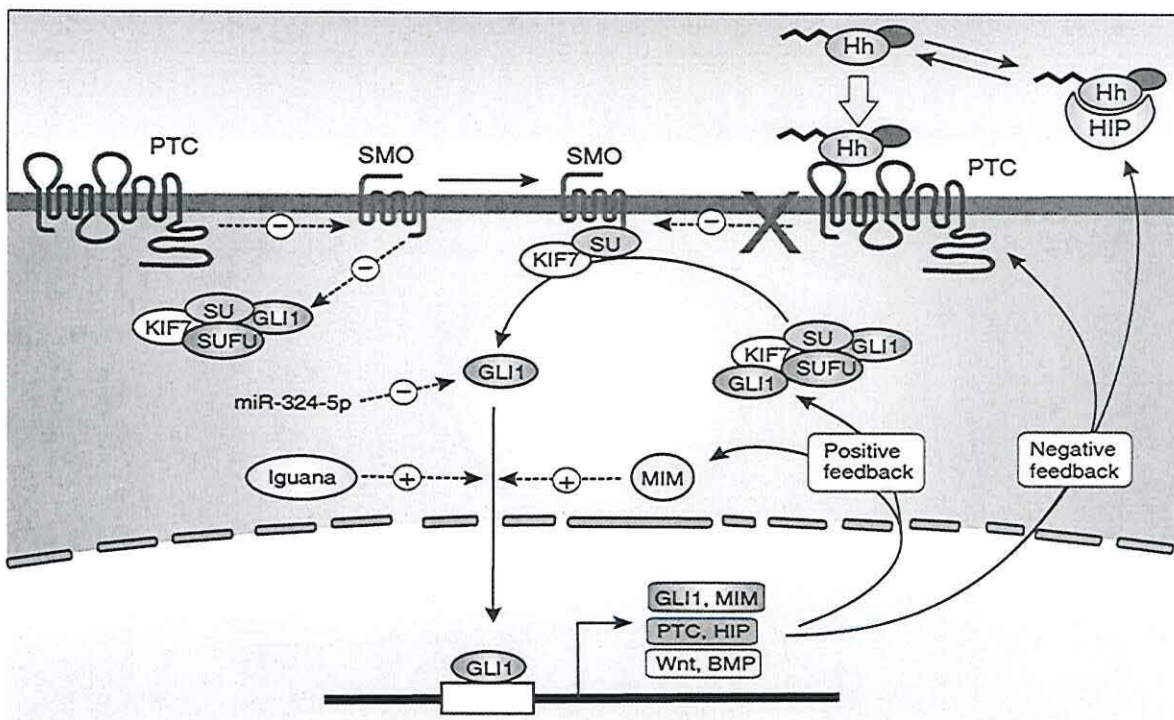
b) Signalling molecules are frequently referred to as ligands, which is a broad term for compounds that bind specifically to other molecules (such as receptors). A ligand's message is frequently delivered through a series of chemical messengers within the cell. Briefly describe the various forms of cell signalling specificity (4)

c) The transfer of a signal from a sending cell to a receiving cell is referred to as cell signalling. Mention **FOUR (4)** General Cell Signalling Principles. (4)

Question 2

[14]

The signalling pathway below is responsible for multiple processes that operate during both development and adult life.



- a) Describe the activation of the signalling pathway (8)
- b) Briefly delineate functions of the Toll receptor signalling pathway (6)

Question 3 [12]

- a) What mechanisms do cancer cells use to escape from the primary tumour? (4)
- b) What have we learned about the initiation of cancer from studying families with predisposing germ-line mutations? (8)

Question 4 [11]

- a) Cyclic AMP is a ubiquitous second messenger that utilises various effectors that regulate a multitude of cellular responses. Briefly describe Protein kinase A (PKA) as one of the effectors responsible for carrying out the cyclic AMP signalling functions. (5)
- b) Mention **SIX (6)** strategies you could use in designing universal primers? (6)

Question 5 [11]

- a) Describe **THREE (3)** specific tasks that are generally tackled by computational tools used in integrating 'omics' data. (3)
- b) Describe the anabolic role of the TCA cycle in fatty acid synthesis. (8)

Question 6 [20]

- 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) Describe the two pathways utilized by the body for the excretion of compounds once they have entered the bloodstream (8)
- c) The characteristic features of an ideal biomarker are variable and relay to some extent on the application and classification of cancer biomarkers. Mostly, Cancer biomarkers have to fulfil general properties to be considered ideal. State **EIGHT (8)** criteria that should be highly considered for the selection of ideal diagnostic biomarkers. (8)

Question 7

[20]

- a) Give generalized molecular and histological descriptions of dysplastic tissue. (8)
- b) What is the role of p53 in normal cells, and to what extent does the loss of p53 function contribute to the Hanahan and Weinberg's "hallmarks of cancer"? (12)

THE END