MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

FOURTH YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF SCIENCE IN MEDICAL LABORATORY, MEDICAL BIOTECHNOLOGY & PHARMACEUTICAL SCIENCE WITH INFORMATION TECHNOLOGY

(MAIN CAMPUS)

PMB 413: INTRODUCTION TO COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

Date: 31st March, 2014 *Time: 8.30 – 10.45am*

INSTRUCTIONS:

- Answer ALL questions in Section A.
- Answer QUESTION and ANY OTHER question in Section B.

SECTION A
ANSWER ALL THE QUESTIONS

1. Outline five areas of molecular sequence analysis applied in bioinformatics (10 marks)
2. (a) Define the term gene families (2 marks)

   (b) Explain the applications of gene families in bioinformatics (8marks)

3. (a) Differentiate between the following terms

   i. Motif and domain (2 marks)
   ii. Sequence similarity and sequence identity of a protein (2 Marks)

   (b) Discuss THREE most important requirements for implementing algorithms for sequence database searching (6 marks)
4. Explain the limitations of biological databases (10 marks)

SECTION B

ANSWER QUESTION ONE AND ANY OTHER QUESTION

1. Describe in details three methods of construction of phylogenetic trees (15 Marks)
2. Giving specific examples, describe the following biological databases (15 Marks)
   i. Primary databases
   ii. Secondary databases
   iii. Specialized databases
3. How is bioinformatics and computational applied in biomedical science? (15 Marks)