RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

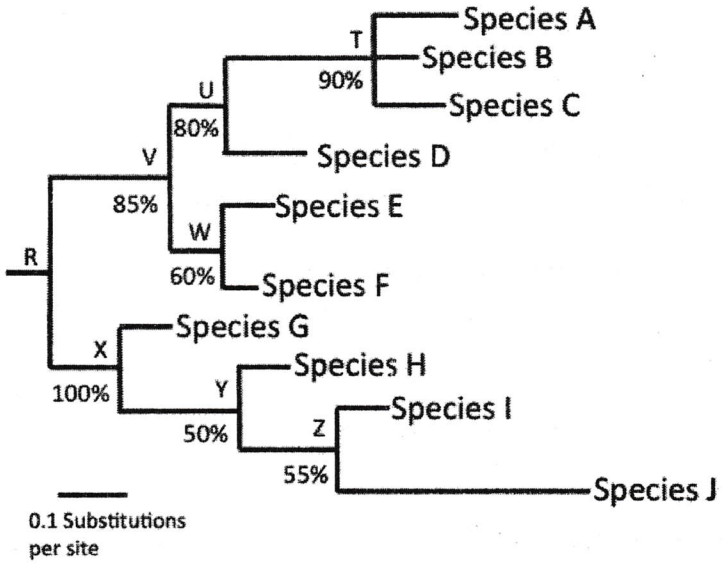
Bachelor of Science in Applied Sciences
Second Year – Semester II Examination –January / February 2023

BIO 2201 – SYSTEMATIC BIOLOGY

Time: Two (02) hours

Answer FOUR (04) questions including question no. 01.

1. The following diagram depicts a molecular phylogeny reconstructed from DNA sequences from ten taxa.



a) List **three (03)** advantages of using DNA sequences for reconstructing phylogenies. **(15 marks)**

b) Of the three main types of phylogenetic trees, which type of phylogenetic tree does the depicted tree represent? Provide **two (02)** reasons for your selection. **(15 marks)**

c) What does the root and internal nodes of a phylogenetic tree represent? **(15 marks)**

d) Describe what a polytomy is, and explain why it is usually termed an unresolved relationship. **(10 marks)**

e) Which of the above nodes represent a polytomy? **(05 marks)**

f) Based on the phylogeny, which species has accumulated the fewest evolutionary changes and which species has accumulated most evolutionary changes since the last common ancestor of all ten species? **(10 marks)**

g) What information did you use from the phylogeny to answer the above (f) question? **(05 marks)**

h) Describe briefly how the confidence level among the relationships in a phylogeny is determined. **(10 marks)**

i) Based on the above (h) answer, list **three (03)** nodes that have high and **two (02)** nodes that have low confidence. **(15 marks)**

2. a) What information can you obtain from the folder characteristics (not from the enclosed herbarium specimens) that carry specimens in the National Herbarium? **(15 marks)**

b) State **five (05)** specific epithets in scientific names of plants and explain how they have been derived according to International Code of Nomenclature (ICN) **(35 marks)**

c) Giving **one (01)** advantage and **one (01)** disadvantage of each method, state **two (02)** common methods of drying plant material in making dry herbarium specimens. **(25 marks)**

d) Define the term "DNA barcode" of a plant species. Explain briefly, giving an example, the importance of barcoding economically important plants. **(25marks)**

3. a) "Plant taxonomy provides evidence for Forensic Science". Justify this statement. **(60 marks)**

b) List the major categories of secondary metabolites used in plant taxonomy. **(10 marks)**

c) Explain the contribution of secondary metabolites in solving the ambiguity regarding the taxonomic position of the family Cactaceae. **(30 marks)**

4. a) Differentiate between a Flora and a botanical monograph. **(30 marks)**

b) Describe giving examples, the different methods of author citation used in plant taxonomy. **(70 marks)**

5. Discuss the use of enzymatic proteins as a source of evidence in plant taxonomy. **(100 marks)**

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