

THE OPEN UNIVERSITY OF SRI LANKA  
B.Sc. / B.Ed. DEGREE PROGRAMME  
LEVEL 04 – 2014/2015



BOU 2102 / BOE 4103 - SYSTEMATICS OF HIGHER PLANTS AND ANIMALS

NO BOOK TEST

DURATION – ONE (01) HOUR

Reg. No. ....

Date: 7<sup>th</sup> March 2015

Time: 2.30 p. m. – 3.30 p. m.

Answer all questions using space provided in the question paper.  
This paper consists of six (06) questions and six (06) pages.

01. a) List major concepts put forwarded for defining a species.

- i).....
- ii).....
- iii).....
- iv).....

b) The first stage of speciation is reproductive isolation. Briefly explain the major mechanisms that prevent fertilization before the zygote is formed which helps in reproductive isolation.

- i).....
- .....
- ii).....
- .....
- iii).....
- .....
- iv).....
- .....

02. a) State two (02) advantages and two disadvantages of use of plant proteins as source of taxonomic evidences.

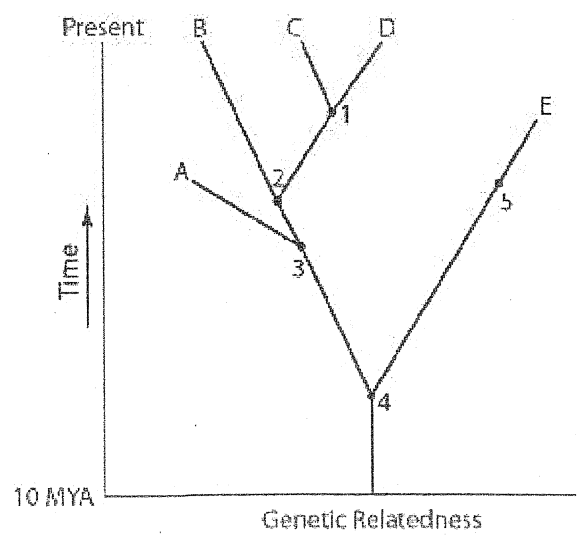
**Advantages**

- i.....  
.....  
.....
- ii.....  
.....  
.....  
.....

**Disadvantages**

- i.....  
.....  
.....
- ii.....  
.....  
.....

03. Based on the diagram given below answer the questions.



i) A common ancestor for both species C and E could be at position number

- A) 1.
- B) 2.
- C) 3.
- D) 4.

ii) The two extant species that are most closely related to each other are

- A) C and D.
- B) B and C.
- C) A and B.
- D) D and E.

iii) Which species are extinct?

- A) A and B
- B) A and E
- C) C and D
- D) D and E

iv) Which extinct species should be the best candidate to serve as the outgroup for the clade whose common ancestor occurs at position 2?

- A) A
- B) B
- C) C
- D) D

v) If this evolutionary tree is an accurate depiction of relatedness, then which of the following should be correct?

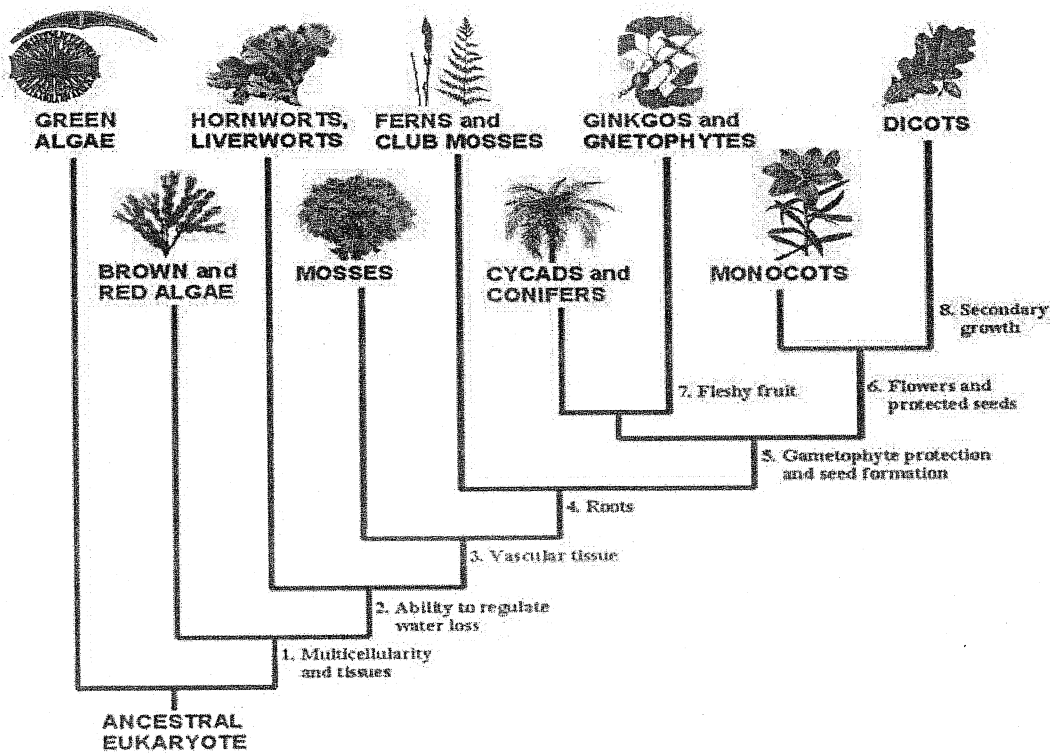
1. The entire tree is based on maximum parsimony.
2. If all species depicted here make up a taxon, this taxon is monophyletic.

3. The last common ancestor of species B and C occurred more recently than the last common ancestor of species D and E.

4. Species A is the direct ancestor of both species B and species C.

5. The species present at position 3 is ancestral to C, D, and E.

- A) 2 and 5
- B) 1, 2 and 3
- C) 3 and 4
- D) 2, 3, and 4



04. Answer the following questions based only on the diagram given above.

a) What group of plants is the one which has the longest evolutionary history?

.....

b). According to the diagram, what is the relationship between mosses and conifers?

.....

c). According to the diagram, which character differs from all other plant groups?

.....

d). What is the difference between green algae and red algae?

.....

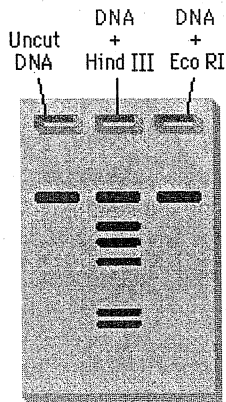
e) Give a common character between the Ferns and Monocots.

.....

05.

i) An instructor had her students perform this laboratory beginning with setting up their own restriction enzyme digests. One team of students had results that looked like those at the left.

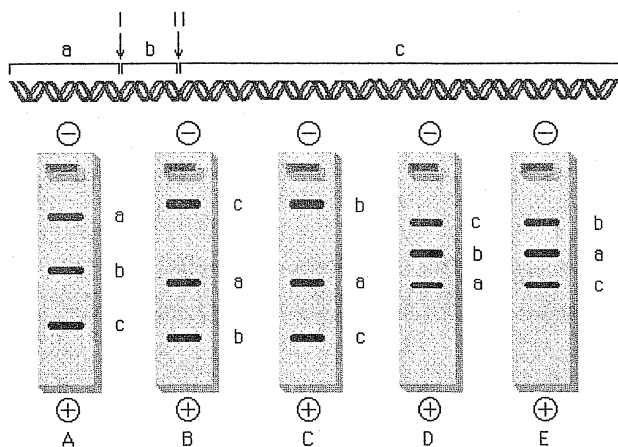
What is the most likely explanation for these results?



- a. The students did not allow enough time for the electrophoresis separation.
- b. The agarose preparation was faulty.
- c. The methylene blue did not stain the DNA evenly.
- d. The restriction enzyme EcoRI did not function properly.
- e. The voltage was set too low on the apparatus.

ii) A segment of DNA has two restriction sites-I and II. When incubated with restriction enzymes I and II, three fragments will be formed-a, b, and c.

Which of the following gels produced by electrophoresis would represent the separation and identity of these fragments?



- i) A
- ii) B
- iii) C
- iv) D
- v) E

iii) DNA possesses

- a) No charge
- b) A positive charge
- c) A negative charge
- d) A supercharge

iv) The rate at which DNA migrates through the gel is determined by,

- a) Molecular size of the DNA and the agarose gel concentration
  - b) Conformation of DNA and the applied voltage
  - c) The length of the agarose gel and the negativity of the DNA
  - d) Both A and B
  - e) Both A and C
- v) How can one tell if their gel electrophoresis is running properly?
- a) It bubbles
  - b) You can see the methyl blue move from the well into the gel

c) The DNA runs to red.

d) Both B and C

e) All three

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