



FACULTY OF SCIENCE

DEPARTMENT OF BOTANY and PLANT BIOTECHNOLOGY

MODULE	PLANT DIVERSITY
	BOT1B10

CAMPUS **APK**

EXAMINATION **NOVEMBER 2016**

DATE
30/November/2016

SESSION
12:30 – 15:30

EXAMINER:

PROF A. MOTEETEE

INTERNAL MODERATOR:

PROF M. VAN DER BANK

DURATION: 3 HOURS

MARKS: 120

NUMBER OF PAGES: 11 PAGES

INSTRUCTIONS: ANSWER ALL THE QUESTIONS

QUESTION 1

[10]

- 1.1 Name five (5) special characteristics of plants. (5)
- 1.2 Give two (2) advantages of using scientific names instead of common names. (2)
- 1.3 What is the system used for naming plants known as? (1)

1.4 What is meant by 'plant nomenclature'? (1)

1.5 Which scientist popularised the binomial nomenclature? (1)

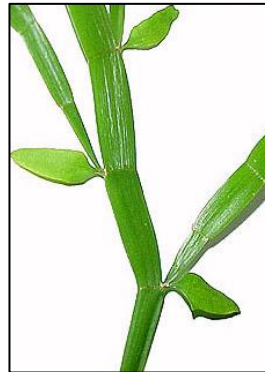
QUESTION 2

[10]

2.1 For each of the pictures below (**A-E**), answer the questions that follow. (10 x ½ =5)



A



B



C



D



E

2.1.1 Which organ has been modified?

2.1.2 What is the name of the structure represented?

2.2 How can dicots and monocots be distinguished on the basis of their roots? (1)

2.3 Distinguish between hemiparasites and holoparasites. (2)

2.4 Name the two (2) types of stem branching in flowering plants. (2)

QUESTION 3

[13]

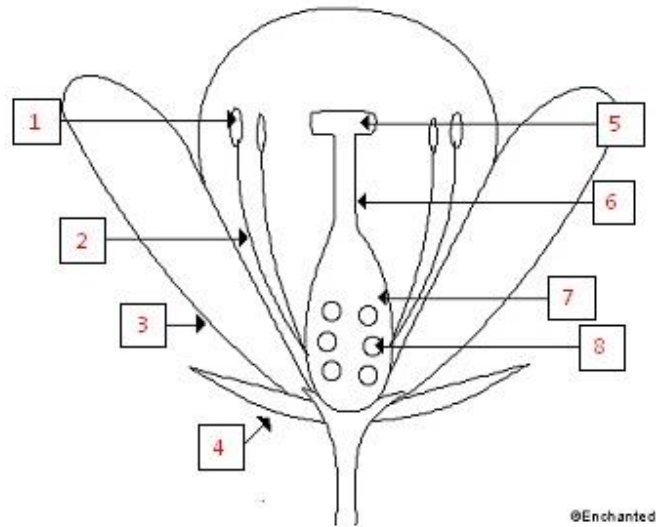
- 3.1 Match the following terms to their correct definitions below (write only the correct letter next to the question). (10 x ½ = 5)

Terms:

- 3.1.1 Androecium
- 3.1.2 Gynostemium stamens
- 3.1.3 Complete flowers
- 3.1.4 Locule
- 3.1.5 Apocarpous gynoecium
- 3.1.6 Axile placentation
- 3.1.7 Didynamous stamens
- 3.1.8 Staminodes
- 3.1.9 Perigone
- 3.1.10 Synandrous stamens

Definitions:

- A. Stamens connate with only their anthers
 - B. Out of four (4) stamens in a flower, two (2) are long and two (2) are short
 - C. Placentation of the central axis of the ovary
 - D. If sepals and petals are indistinguishable from each other
 - E. Male reproductive parts composed of stamens
 - F. Stamens attached to the style
 - G. Sterile stamens
 - H. Small cavity/compartment within a plant ovary
 - I. Carpels that are fused with each other to form a single pistil
 - J. Flowers bearing both male and female reproductive parts
 - K. Out of six (6) stamens in a flower, the two (2) outer are short and four (4) inner are longer
 - L. Placentation arranged along the margin of a unilocular ovary
 - M. A collective term for petals
- 3.2 Distinguish between connation and adnation of floral parts. (2)
- 3.3 Distinguish between complete and perfect flowers. (2)
- 3.4 Provide labels for the flower shown in the diagram below: (8 x ½ = 4)

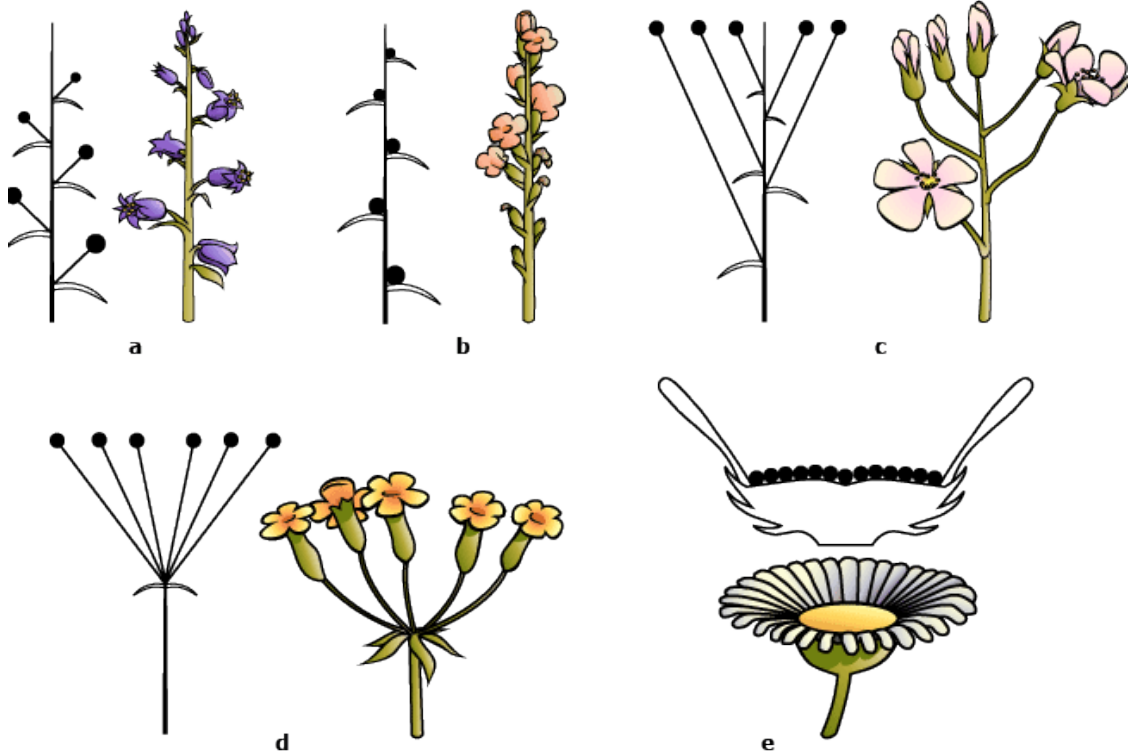


QUESTION 4

[12]

4.1 Identify the inflorescence types (**a-e**) depicted in the following pictures:

(5)



4.2 Name two (2) types of inflorescences and give a short description of each.

(4)

- 4.3 A flower having a stalk attached to the peduncle is said to be what? (1)
- 4.4 Flowers that are not grouped into inflorescences but formed singly are known as what flowers? (1)
- 4.5 What is the function of bracts? (1)

QUESTION 5

[8]

- 5.1 Which pollination agents pollinate flowers with the following characteristics? (3)
- 5.1.1 Flowers that are dull in colour, but have very strong odour
 - 5.1.2 Red and orange, fragrant flowers
 - 5.1.3 Flowers or pollen long and filamentous or feathery, small and inconspicuous with lots of pollen grains
- 5.2 What other two (2) vectors may be accidental pollination agents? (2)
- 5.3 Name two (2) types of flowers based on maturation sequence of anthers and stigmas. (2)
- 5.4 What is the phenomenon represented by the photos below? (1)



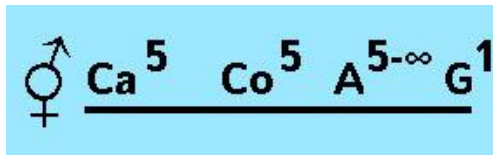
QUESTION 6

[6]

- 6.1 How are the following characteristics of floral parts represented in a floral formula? (3)
- 6.1.1 Adnation
 - 6.1.2 Bilateral symmetry
 - 6.1.3 Sepals and petals that are indistinguishable

6.2 Describe the flower represented by the floral formula below.

(6 x ½ =3)



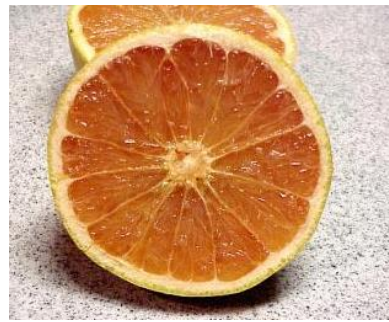
QUESTION 7

[9]

7.1 For each of the fruits shown below, answer the questions that follow. Tabulate your answers. (10 x ½ = 5)



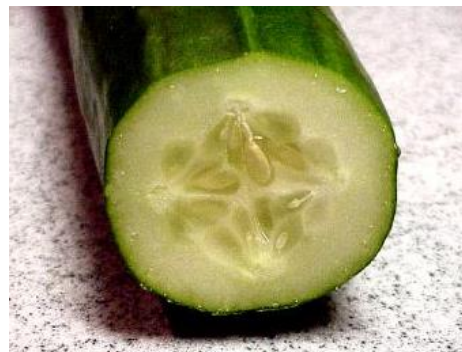
A



B



C



D

7.1.1 What is the botanical name of this fruit?

7.1.2 Is the fruit dry or fleshy?

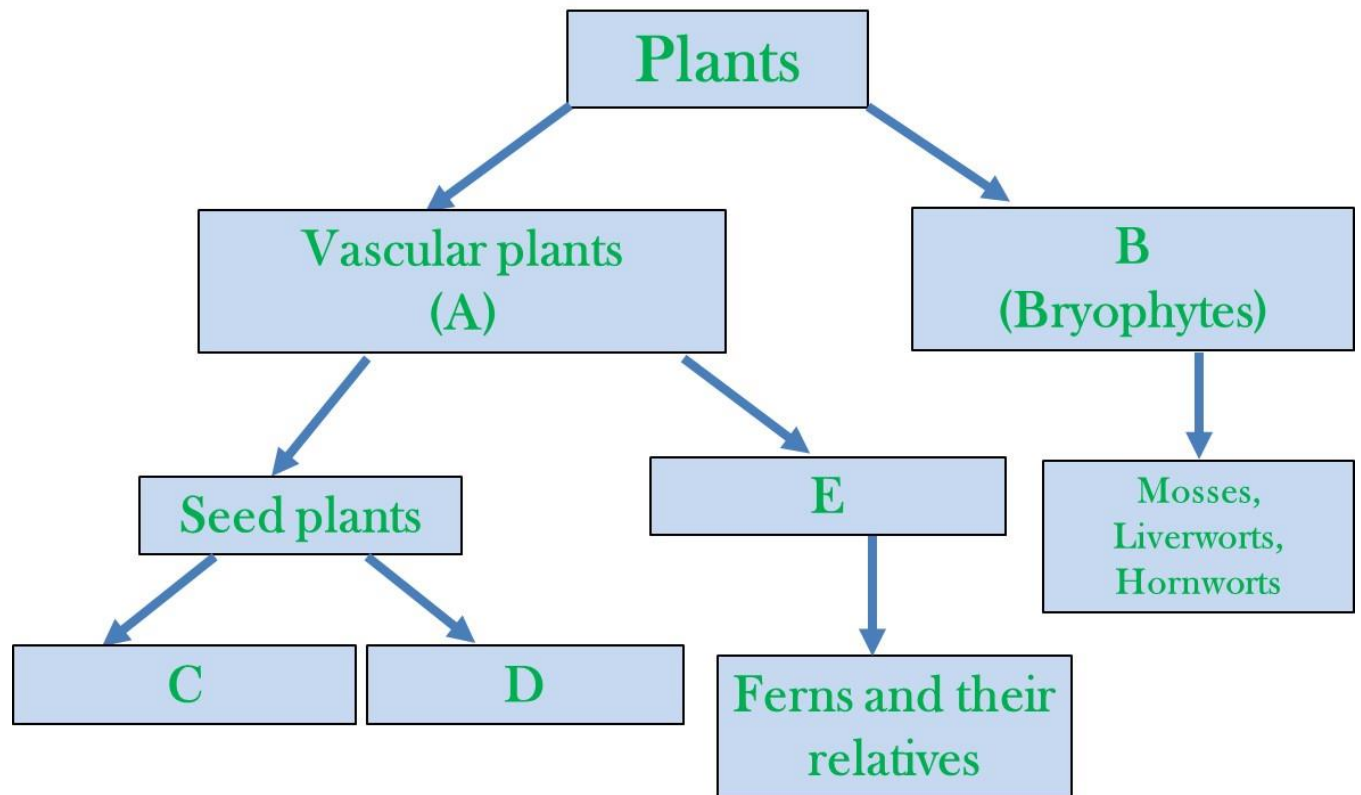
7.1.3 If dry, is the fruit dehiscent or indehiscent?

7.2 Name any four (4) criteria which form the basis for the classification of fruits. (4)

QUESTION 8

[5]

Provide the labels for letters **A-E** to complete the missing information in the diagram below.



QUESTION 9

[8]

Answer the following questions based on the photographs provided below:



A



B



C



D

- 9.1 To which group of plants do these plants (**A-D**) belong? (1)
- 9.2 Provide the genus name for the plant shown in **D**. (1)
- 9.3 Why is the plant shown in **D** regarded as a “living fossil”? (1)
- 9.4 To which **division** does the plant shown in **C** belong? (1)
- 9.5 Where in southern Africa is the plant labelled **C** restricted? (1)
- 9.6 What is the collective common name for the plants shown in **B** (N.B. not pines)? (1)
- 9.7 Apart from pine trees, which other plants belong to the group represented in **B**? Give one (1) example. (1)

- 9.8 With which group of organisms do the plants shown in **A** have a mutually beneficial relationship? (1)

QUESTION 10

[10]

- 10.1 Complete the following sentence regarding reproduction in angiosperms (write only the correct answer next to the relevant letter). (6 x ½ = 3)

The *anthers* produce _____(i)_____by meiosis, and these develop into male *gametophytes* (= _____(ii)_____) by _____(iii)_____. The _____(iv)_____ produce *megaspores*, which grow into female _____(v)_____ through mitosis, each of which then produces an _____(vi)_____.

- 10.2 Which processes are initiated as a result of double fertilization in angiosperm? (6)
- 10.3 Name one (1) distinguishing feature between dicot and monocot seeds. (1)

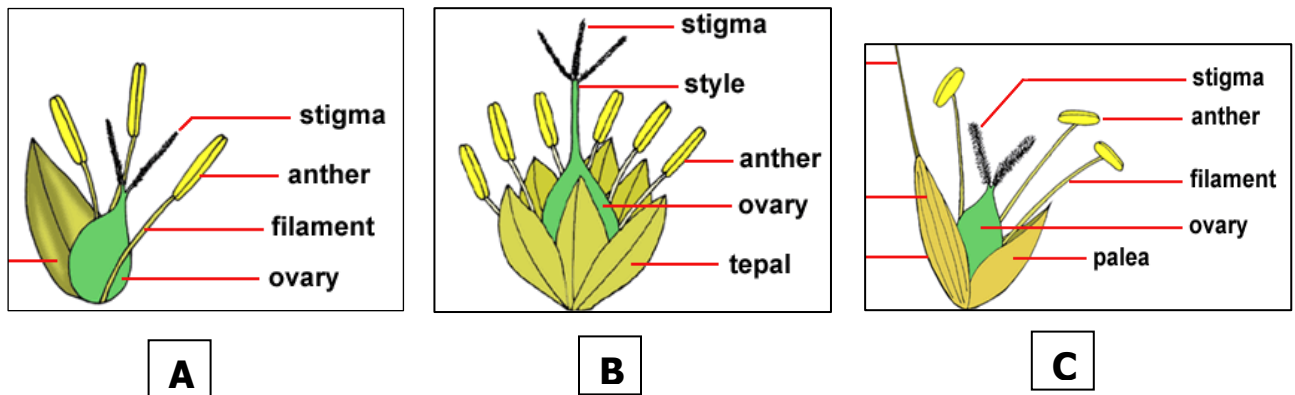
QUESTION 11

[14]

- 11.1 Which is the second largest flowering plant family in the world? (1)
- 11.2 The family Orchidaceae has many unique characteristics which distinguish it from other flowering plants. Name some of these features based on the following: (4)
- 11.1.1 Symmetry of the flowers
 - 11.1.2 Number of anthers
 - 11.1.3 Petal modification
 - 11.1.4 Direction of the flower
- 11.3 Name one (1) characteristic reproductive feature of the family Liliaceae. (1)
- 11.4 What type of fruit is produced by the Liliaceae? (2)

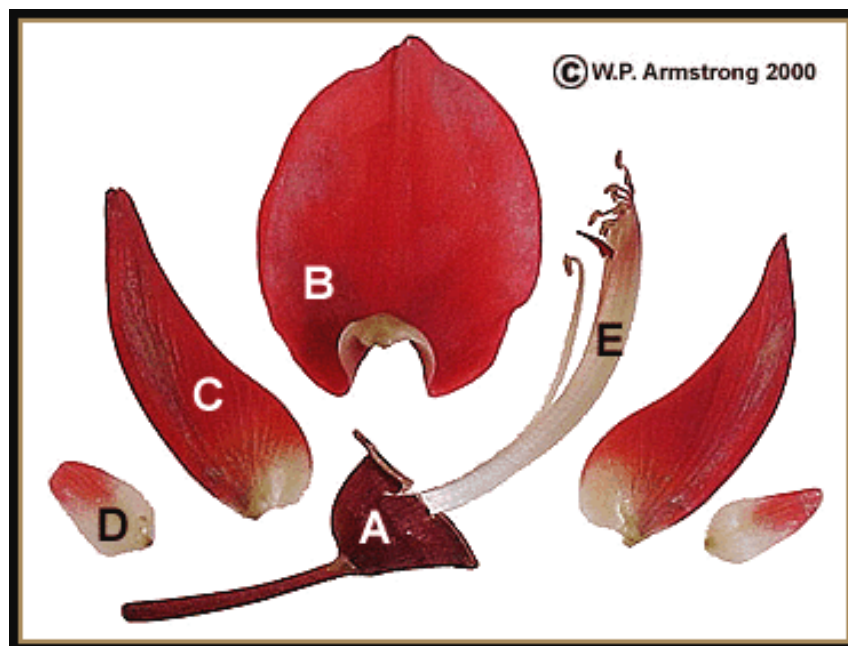
11.5 To which angiosperm family does each of the following flower belong?

$$(3 \times \frac{1}{2} = 1\frac{1}{2})$$



11.6 Label (A-E) the following flower belonging to some members of the family Fabaceae.

$$(5 \times \frac{1}{2} = 2\frac{1}{2})$$



11.7 To which family does the South African national flower belong? (1)

11.8 What type of inflorescence do members of this family (11.7 above) have? (1)

QUESTION 12

[15]

- 12.1 Give two reasons why diagrams of feeding relationships give a pyramid shape. (2)
- 12.2 Name five (5) components (trophic levels) of a food chain. (5)
- 12.3 State the second law of thermodynamics. (2)
- 12.4 Name three (3) types of symbiotic relationships. (3)
- 12.5 Describe the Fynbos biome of South Africa (3)