UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF BOTANY and PLANT BIOTECHNOLOGY

MODULE	**PLANT DIVERSITY BOT1B10**
CAMPUS	**APK**
EXAMINATION	**NOVEMBER 2018**

DATE
21/November/2018

SESSION
11:30 – 14:30

EXAMINER: **PROF A. MOTEETEE**

INTERNAL MODERATOR: **MRS J. WILLIAMSON**

DURATION: 3 HOURS **MARKS: 120**

NUMBER OF PAGES: **8 PAGES**

INSTRUCTIONS: **ANSWER ALL THE QUESTIONS**

QUESTION 1

[10]

1.1 Plants are essential to our survival as humans. Give one (1) example of a plant (English name) that is used for the following purposes: (5)

a) Clothing
b) Medicine
c) Herbs and spices
d) Industrial chemicals
e) Essential oils

1.2 What are the five (5) special characteristics of plants? (5)

QUESTION 2 **[5]**

2.1 Provide the full scientific name for the South African national flower. (1)

2.2 Which rules must a botanist follow if they discover a new plant species? (4)

QUESTION 3 **[10]**

3.1 Identify the metamorphic leaves shown below (A-E): (5)

A

B

C

D

E

3.2 Define the following terms with regards to leaf morphology: (5)

a) Lamina
b) Sessile
c) Pulvinus
d) Pinnae
e) Phyllotaxy

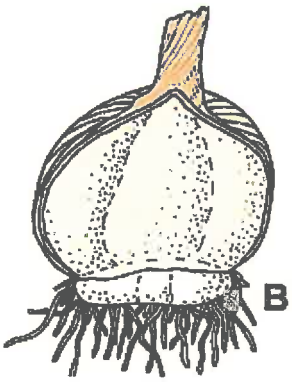
QUESTION 4 **[10]**

4.1 Name two (2) different types of roots based on where they occur. (2)

4.2 List any six (6) different types of metamorphic roots that occur in nature. (6 x ½ = 3)

4.2 Identify the modified stems in the diagrams below (A-E). (5)

A



C

D

E

QUESTION 5 **[10]**

5.1 What is another name for indeterminate inflorescences? List the seven (7) types of indeterminate inflorescences found in flowering plants. (8 x ½ = 4)

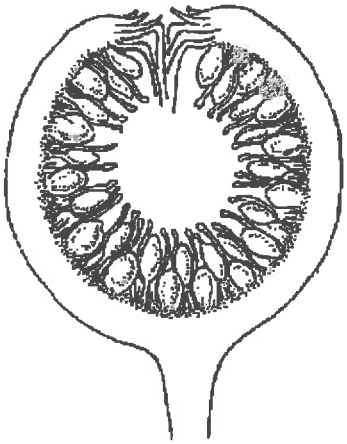
5.2 Describe the following types of flowers and inflorescences: (3)

a) Pedicellate flowers

b) Sympodial inflorescences

c) Solitary flowers

5.3 Differentiate between the three (3) types of flowers located inside the inflorescence below: (3)



QUESTION 6 **[15]**

6.1 Complete the missing information in the following table about fruits. Write only the correct answer next to the letter (A-T) in your answer book. (20 x ½ = 10)

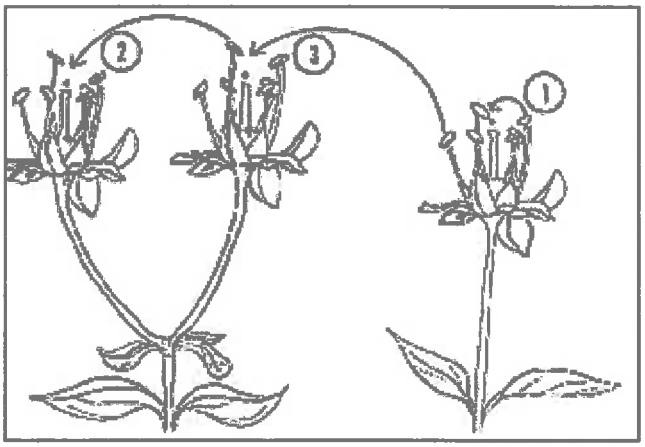
Example of fruit/plant	Botanical name	Classification of fruit	Fruit type	Dehiscence
Apple	**A**	simple	fleshy	N/A
B	Achene	**C**	**D**	indehiscent
Pineapple	N/A	**E**	N/A	N/A
Beans	**F**	**G**	dry	**H**
I	Hesperidium	simple	**J**	N/A
Maize	**K**	**L**	dry	**M**
N	N/A	Aggregate	N/A	N/A
Peach	**O**	**P**	fleshy	N/A
Q	Pepo	simple	**R**	N/A
Lilies	**S**	simple	**T**	dehiscent

6.2 What are the criteria used for classifying fruits? (5)

QUESTION 7 **[15]**

7.1 Name four (4) attractants produced by flowering plants to attract pollinators. (4 x ½ = 2)

7.2 Which specific type of pollination is taking place at 1, 2 and 3 in the diagam below? (3)



7.3 Provide a description of flowers that are pollinated by bees. (4 x ½ = 2)

7.4 What are the advantages and disadvantages of cross-pollination? (3)

7.5 Draw diagrams to illustrate the development of a pollen grain in flowering plants. (4)

7.6 What is meant by the term heterostyly? (1)

QUESTION 8 **[5]**

8.1 Write a floral formula for a flower with the following characteristics: (3)

Asymmetrical, hermaphrodite, 5 connate sepals, 5 petals, 5 fertile and 5 sterile stamens arranged in two (2) rows and adnate to the petals, gynoecium with 2 fused carpels and superior ovary

8.2 Distinguish between monocarpous and apocarpous gynoecium. (2)

QUESTION 9 **[5]**

9.1 Distinguish between seed- and seedless plants. (3)

9.2 Draw a typical life cycle of non-vascular plants. (4 x ½ = 2)

QUESTION 10 [10]

10.1 Illustrate the process of microsporogenesis and mirogametogenesis in flowering plants. (4)

10.2 Study the photo shown below and answer the questions that follow:

a) To which phylum does this plant belong? (1)

b) Where in Africa does this plant grow? (1)

c) Provide a scientific name for this plant. (1)

d) Name one (1) characteristic shared by this plant and flowering plants. (1)

e) Why do landscapers prefer to plant only male plants of the ginkgo tree? (1)

f) With which organisms do cycads have a symbiotic relationship? (1)

QUESTION 11 [20]

11.1 Indicate whether the following flowering plant families are monocots or dicots. (5 x ½ = 2½)

a) Liliaceae

b) Brassiceae

c) Juncaceae

d) Apiaceae

e) Orchidaceae

11.2 What type of inflorescence is produced by the family Proteaceae? (½)

11.3 What type of fruits are produced by members of the family Proteaceae? (4 x ½= 2)

11.4 Distinguish between the families Poaceae, Cyperaceae and Juncaceae on the basis of the following:

a) Fruits (3 x ½ = 1½)

b) Stem morphology (3 x ½ = 1½)

c) Flower morphology (3)

11.5 Draw and label a typical flower in the subfamily Fabaceae. (8 x ½ = 4)

11.6 To which family do the following plants belong? (5)

a) Coffee

b) Cabbage

c) Garlic

d) Carrot

e) Sunflower

QUESTION 12 **[5]**

12.1 Describe the First Law of Thermodynamics. (1)

12.2 Name three (3) types of symbiotic relationships in a community. (3 x ½ = 1½)

12.3 Name any five (5) major biomes in South Africa. (5 x ½ = 2½)