



**FACULTY OF SCIENCE**

**DEPARTMENT OF BOTANY and PLANT BIOTECHNOLOGY**

**MODULE**                      **PLANT DIVERSITY**  
**BOT01B1/BOT1B10**

**CAMPUS**                      **APK**

**EXAMINATION**              **January 2020**

**DATE**  
7/January/2019

**SESSION**  
11:30 – 14:30

**EXAMINER:**

**PROF A. MOTEETEE**

**INTERNAL MODERATOR:**

**MRS J. WILLIAMSON**

**DURATION: 3 HOURS**

**MARKS: 130**

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**NUMBER OF PAGES:**                      **10 PAGES**

**NUMBER OF QUESTIONS:**              **12 QUESTIONS**

**INSTRUCTIONS:**                      **ANSWER ALL THE QUESTIONS**

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**QUESTION 1**

**[10]**

Choose an answer that matches the question the best: only write down the correct answer next to the appropriate question number on your answer sheet.

- 1.1. Apart from food and beverages, plants provide human beings with:
- a) Oxygen, nitrogen, construction materials
  - b) Medicines, essential oils, oxygen, fuel
  - c) Paper, wool, cotton, silk
  - d) Herb and spices, carbon, sodium, fodder for animals

- 1.2 Gymnosperms bear their seeds on the surfaces of:
- a) Leaves
  - b) Cones
  - c) Stems
  - d) Fruits
- 1.3 The largest tree on earth is commonly known as?
- a) Giant squid
  - b) Baobab tree
  - c) Giant sequoia
  - d) *Welwitschia mirabilis*
- 1.4 Which of the following words/phrases does not describe plants?
- a) They revolve
  - b) They are photosynthetic
  - c) Plants react to stimuli
  - d) Plants reproduce
- 1.5 Which on the following is the stalk by which the leaf blade is attached to the stem?
- a) Peduncle
  - b) Pedicel
  - c) Inflorescence
  - d) Petiole
- 1.6 Seed plants use \_\_\_\_\_ and \_\_\_\_\_ to reproduce.
- a) Pollen and seed
  - b) Seeds and water
  - c) Food and water
  - d) Leaves and petals
- 1.7 Wind pollination relies on \_\_\_\_\_ to get pollen from one plant to another.
- a) Weather
  - b) Plants
  - c) Animals
  - d) Insects
- 1.8 In plants, a long trailing stem that produces roots when it touches the ground is a:
- a) Phyllode
  - b) Tendril
  - c) Stolon
  - d) Hypocotyl
- 1.9 Haploid or gamete-producing phase of a plant is called a:
- a) Gametophyte

- b) Pollen
- c) Embryo sac
- d) Sporophyte

1.10 Characteristics of the Plant Kingdom:

- a) Photosynthetic, no alternation of generations, unicellular
- b) Heterotrophic, alternation of generations, cellulose cell walls
- c) Photosynthetic, multicellular, alternation of generations, cellulose cell walls
- d) Photosynthetic, no alternation of generations, cellulose cell walls, unicellular

**QUESTION 2**

**[5]**

- 2.1 Write this scientific name correctly: *Cynaroides protea* (2)
- 2.2 Mention one (1) advantage of naming plants in Latin (1)
- 2.3 What are the advantages of using scientific names instead of common names? Name two (2). (2)

**QUESTION 3**

**[10]**

- 3.1 Name four (4) ways in which leaves can be arranged on a stem. (4 x ½ =2)
- 3.2 What is meant by the following terms with regards to leaves? (2)
  - a) Petiolate
  - b) Exstipulate
- 3.3 Name four (4) functions of metarmorphic leaves. (4)
- 3.4 Distinguish between heteroblastic and homoblastic leaves. (2)

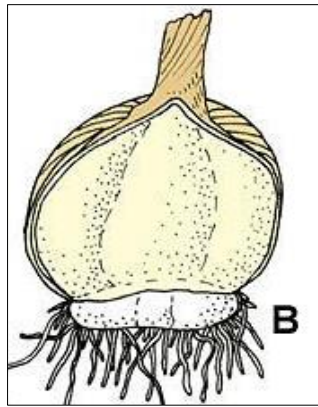
**QUESTION 4**

**[15]**

- 4.1 Distinguish between monopodial and sympodial branching. (2)
- 4.2 Provide names for the following modified stems and give one (1) function of each. (10 x ½ = 5)



**A**



**B**



**C**



**D**



**E**

4.3 Provide functions of the following modified roots.

(5)

- a) Pneumatophores
- b) Crampons
- c) Prop roots
- d) Epiphytes
- e) Contractile roots

4.4 Mention three (3) functions of roots.

(3)

**QUESTION 5**

**[10]**

5.1 Define the following terms:

(5)

- a) Staminate flowers
- b) Tetradynamous flowers
- c) Adnation
- d) Gynostenium stamens
- e) Tepals

5.2 List five (5) different types of indeterminate inflorescences.

(5)

**QUESTION 6**

**[10]**

6.1 Name the basic parts of a fruit.

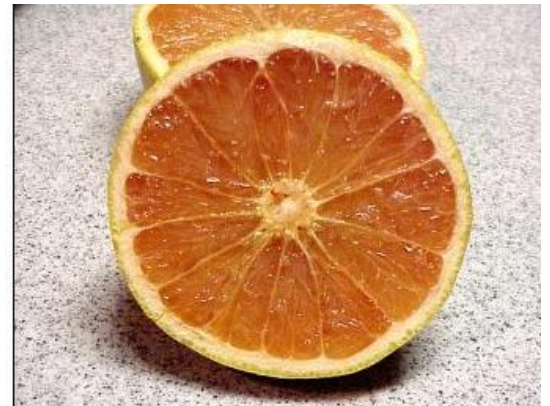
(7 x ½ = 3½)

6.2 Provide the botanical names for the fruits shown in the following images.

(5)



**A**



**B**



C



D



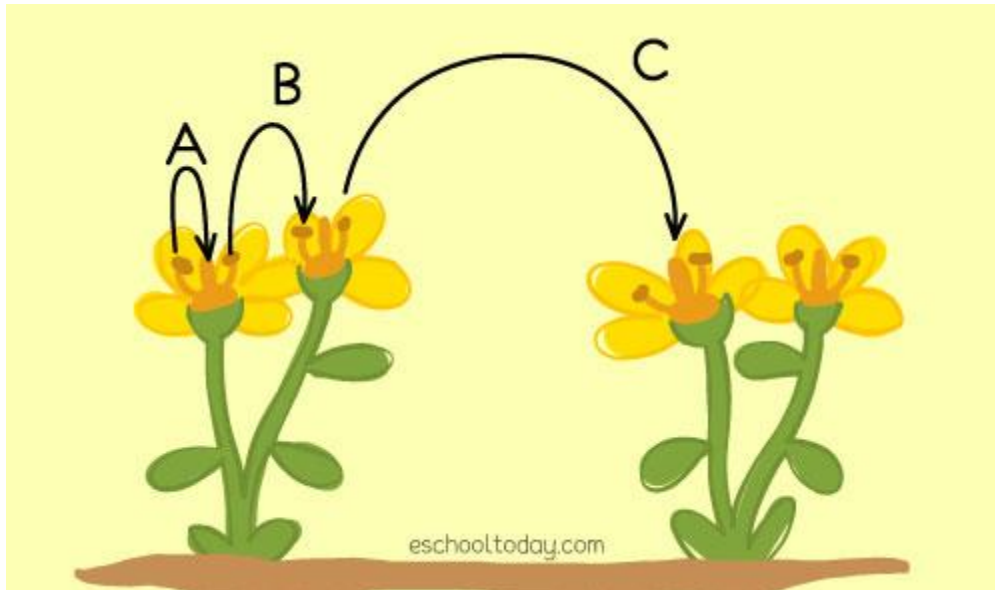
E

- 6.3 Based on the **number of ovaries, carpels & flowers** that take part in fruit formation, what are the three (3) main groups of fruits? (3 x ½ = 1½)

**QUESTION 7**

**[10]**

- 7.1 What type of pollination is taking place at each of the letters A, B, and C in the image below? (3)



7.2 Which insects pollinate flowers with the following characteristics? (5)

- a) Flowers with very strong fruity odours
- b) Red and orange flowers
- c) Flowers near the ground
- d) Flowers with foul smells
- e) Yellow and blue flowers

7.3 Mention one (1) advantage and one (1) disadvantage of cross-pollination. (2)

### **QUESTION 8**

[6]

Provide symbols for flower parts with the following features:

- a) Connate carpels
- b) Adnate parts
- c) Two rows of stamens
- d) Staminodes
- e) Inferior ovary
- f) A missing floral part

### **QUESTION 9**

[5]

Draw a diagram depicting the alternation of generations life cycle typical of all plants.

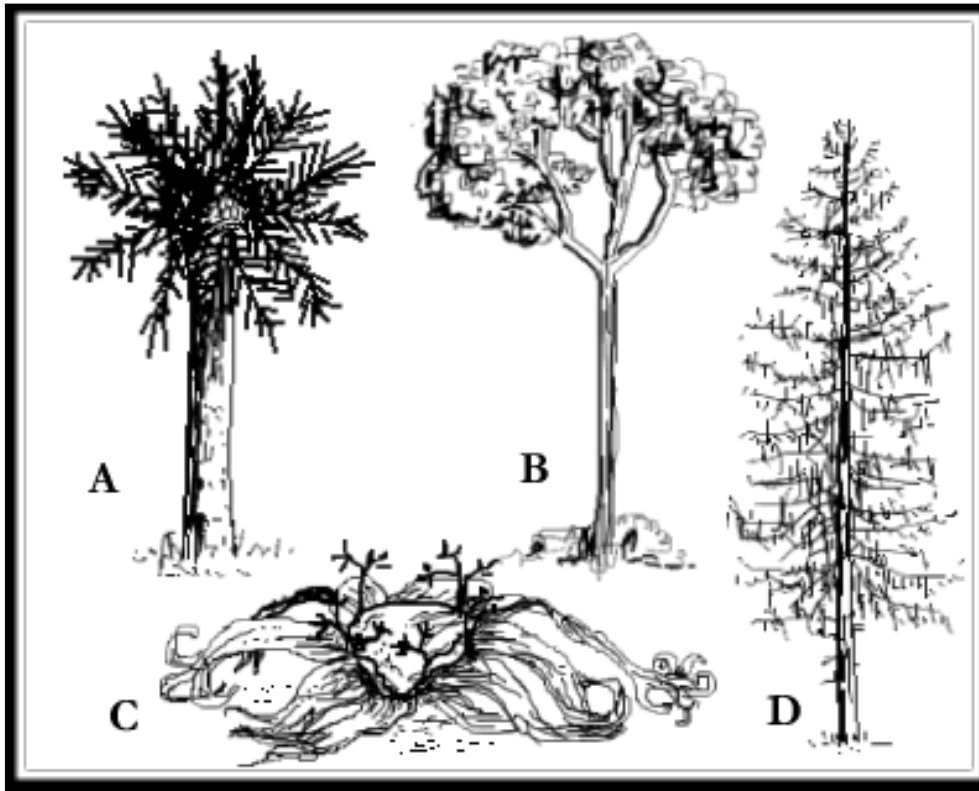
### **QUESTION 10**

[14]

10.1 Illustrate the process of megagametogenesis in flowering plants.

(5)

- 10.2 Describe the process of double fertilization in flowering plants. (2)
- 10.3 Study the diagrams below and then answer the questions that follow:



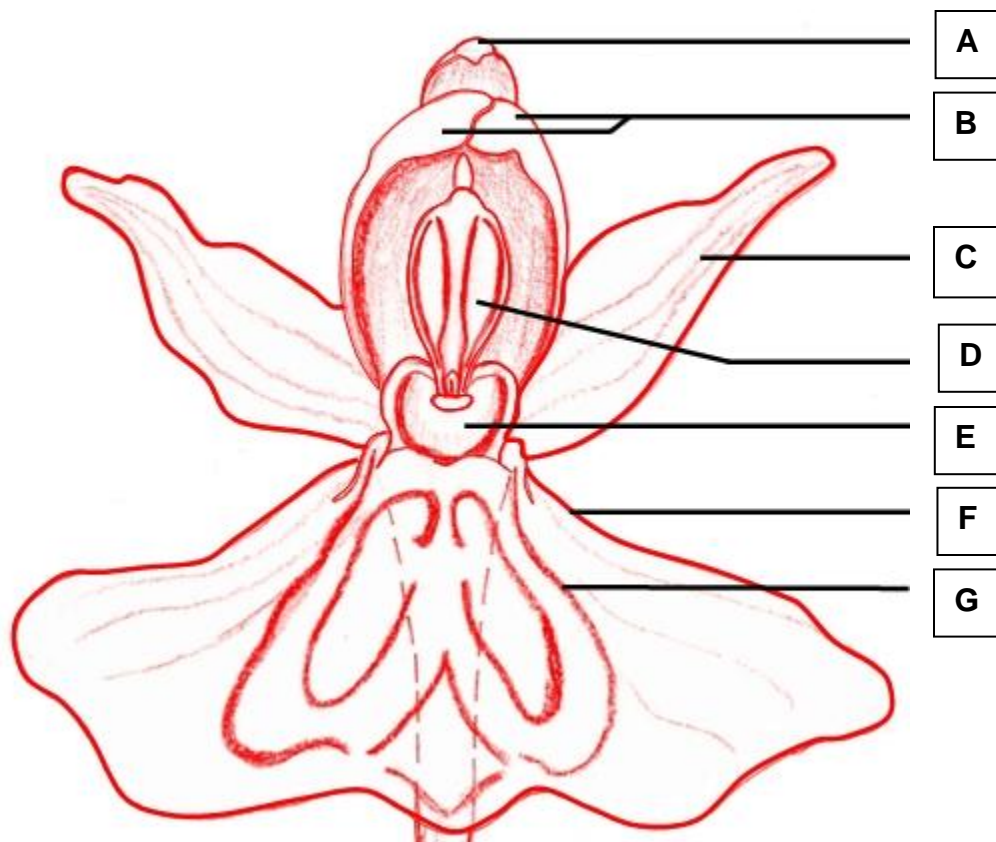
- a) To which main group of plants do all these plant species belong? (1)
- b) List three (3) characteristics of the plant group mentioned in question a) (3)
- c) Provide the genus name of the plant labelled C. (2)
- d) In which part of the world does the plant labelled C occur? (1)

**QUESTION 11**

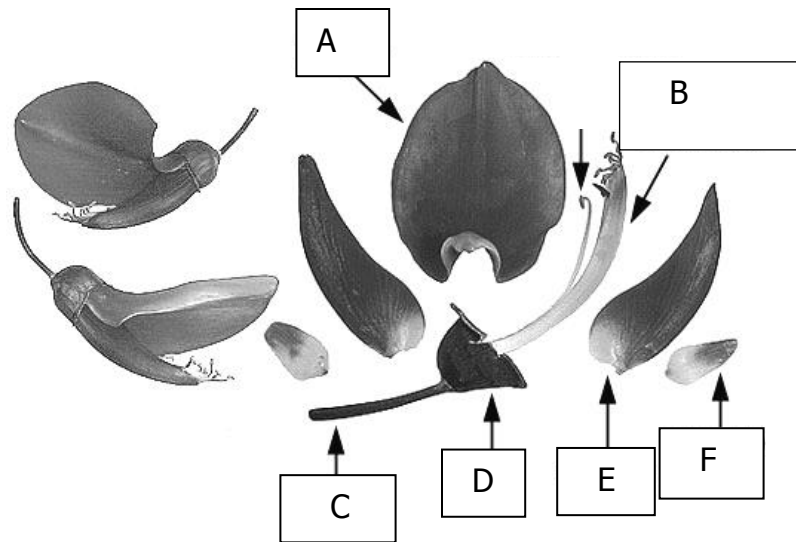
**[20]**

- 11.1 Which is the largest family of flowering plants? (1)
- 11.2 Provide labels for the indicated parts (A-G) of an orchid flower on the next page:

$(7 \times \frac{1}{2} = 3\frac{1}{2})$



- 11.4 To which flowering plant family do onions, garlic and shallots belong? (1)
- 11.5 Name two (2) ways in which some members of the Liliaceae are important to human beings. (3)
- 11.6 Tabulate three (3) differences between the families Poaceae, Cyperaceae and Juncaceae (9 x ½ = 4 ½)
- 11.7 Into how many subfamilies is the family currently Fabaceae divided? (1)
- 11.8 Provide labels (A-F) for the flower parts as indicated on the next page: (6 x ½ = 3)



11.9 To which angiosperm families do the following plants belong?

(6 x ½ =3)

- a) King protea
- b) *Coffee arabica*
- c) Cabbage
- d) Sunflower
- e) Tomato
- f) Carrot

## **QUESTION 12**

**[15]**

- 12.1 Draw a typical **food chain** in a forest ecosystem. (5)
- 12.2 Name any three (3) types of plant adaptations to the environment. (3)
- 12.3 Distinguish between mutualism and parasitism. (2)
- 12.4 Describe the Fynbos biome of South Africa. (3)
- 12.5 Name two (2) characteristics of the Grassland biome in South Africa. (2)