



FACULTY OF SCIENCE

DEPARTMENT OF BOTANY AND PLANT BIOTECHNOLOGY

MODULE BOT02A2 PLANT ANATOMY AND CYTOLOGY

CAMPUS APK

EXAM JULY 2017

DATE: 18 JULY 2017

SESSION: 11:30 – 13:30

ASSESSOR:

DR AA OSKOLSKII

INTERNAL MODERATOR:

DR EL KOTINA

DURATION: 2 HOURS

MARKS: 100

NUMBER OF PAGES: 4 PAGES

INSTRUCTIONS: ANSWER ALL THE QUESTIONS.

REQUIREMENTS: EXAM BOOK

BOT02A2 – ANATOMY & CYTOLOGY SUPPLEMENTARY

QUESTION 1

Study the micrograph of a plant structure (Fig. 1).

- 1.1 What type of microscope was used to take this image? Write your answer in full. (1)
 - 1.2 Mention *one* significant advantage of using this type of microscope and *one* disadvantage. (2)
 - 1.3 Name this plant structure. (2)
 - 1.4 Identify the structures marked by **a**. (2)
 - 1.5 What is the magnification of this micrograph? (2)
- [9]**

QUESTION 2

Study the micrograph of a cell (Fig. 2)

- 2.1 By referring to two specific structures in the micrograph, explain whether this is a plant or an animal cell. (3)
 - 2.2 What type of microscope was used to take this image? Write your answer in full. (2)
 - 2.3 Identify each of the following letters as specifically as possible: **a, b, c, d, e, f, g** (7)
 - 2.4 Give *one* main function of (4)
 - 2.4.1 **c**
 - 2.4.2 **d**
 - 2.5 What tissue could this cell form part of? Motivate your answer. (2)
 - 2.6 This micrograph is magnified 10 000 times (x 10 000). What is the approximate size of this cell (CS) ? Show your working. (4)
- [22]**

QUESTION 3

Study the microphoto (Figure 3) of a portion of a cell with a complete plastid and then answer the following questions relating to it.

- 3.1 What type of microscope was used to take this image? Write your answer in full. (1)
- 3.2 Mention *one* significant advantage of using this type of microscope and *one* disadvantage. (2)
- 3.3 This plastid is in the process of changing from one type to another.

QUESTION 3 (CONTINUING)

- 3.3.1 What are these two types? Explain your answer by referring to a characteristic feature of each of these plastids visible in the microphoto. (4)
- 3.3.2 Give an example of an event in the life of a plant when this process would take place. (2)
- 3.4 Name two structures (not necessarily visible in this microphoto) which are characteristic of *all* plastids. (2)
- 3.5 What is the approximate size of this plastid? (2)
- [13]**

QUESTION 4

Study the diagram of a transverse section through the leaf (Figure 4).

- 4.1 Is this a C3 or C4 plant? Explain your answer by referring to one anatomical structure. (3)
- 4.2 Draw sufficient of the diagram (no details of cells required) to show the following: bundle sheath extension, conductive bundle, xylem, phloem, palisade mesophyll, spongy mesophyll, stoma. Label these structures. (7)
- 4.3 Label the adaxial epidermis and the abaxial epidermis. Explain your answer by referring to two anatomical differences between upper and lower sides of a leaf. (3)
- 4.4 Is this a sun or shade leaf? Motivate your answer. (3)
- [16]**

QUESTION 5

Study the microphoto of a portion of wood (Figure 5).

- 5.1 What type of section is it? (3)
- 5.2 Is the plant a gymnosperm, monocotyledon or dicotyledon? Motivate your answer. (2)
- 5.3 Identify each of the following structures as specifically as possible: a, b, c, d (4)
- 5.4 Mention the main function of each of the structures **a** and **d** (2)
- [11]**

QUESTION 6

Study the diagrams which represent a transverse (cross) section through a plant organ and its portion (Figure 6).

- 6.1 Identify this organ (1)
- 6.2 Is the plant monocot or dicot? Motivate your answer (3)
- 6.3 Identify each of the following structures as specifically as possible: **1, 2, 3, 4, 5** (5)
- 6.4 Mention the main function of the structure **3** (2)
- [11]**

QUESTION 7

- 7.1 Mention two main ways in which microtubules differ from microfilaments (excluding functions). (2)
- 7.2 Which portion of a cell wall (middle lamella, primary wall, secondary wall) is closest to the plasmalemma? (1)
- 7.3 Mention the most significant difference in the fertilization process between gymnosperms and angiosperms. (2)

[5]

QUESTION 8

Refer to the diagrams (Figures 7 and 8) in order to answer the following:

- 8.1. Diagrams (Figure 7 a – d) represent various seeds. For each of these diagrams, write down the number of the label line pointing to
- 8.1.1 the radicle.
- 8.1.2 the endosperm, if present. (8)
- 8.2 Study the Figure 8. What type of germination is shown? Explain your answer. (2)
- [10]

QUESTION 9

Give the correct term for each of the following:

- 9.1 A microsporangium of angiosperms. (1)
- 9.2 The secondary protective tissue. (1)
- 9.3 The generation in the life cycle of plants which develops from spores. (1)
- [3]
- TOTAL [100]**

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Figure 1

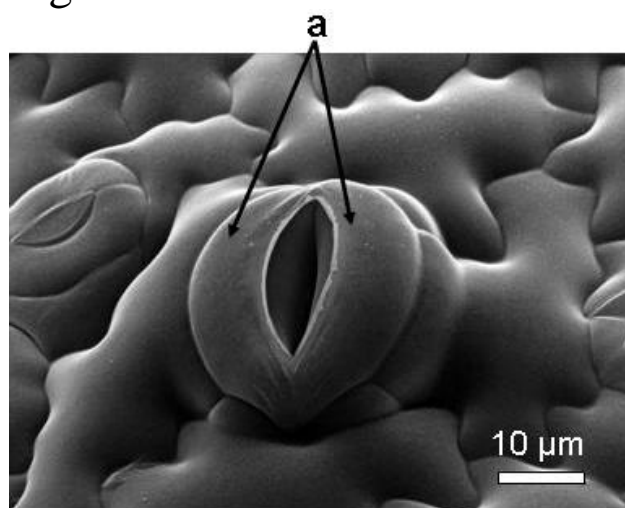


Figure 2

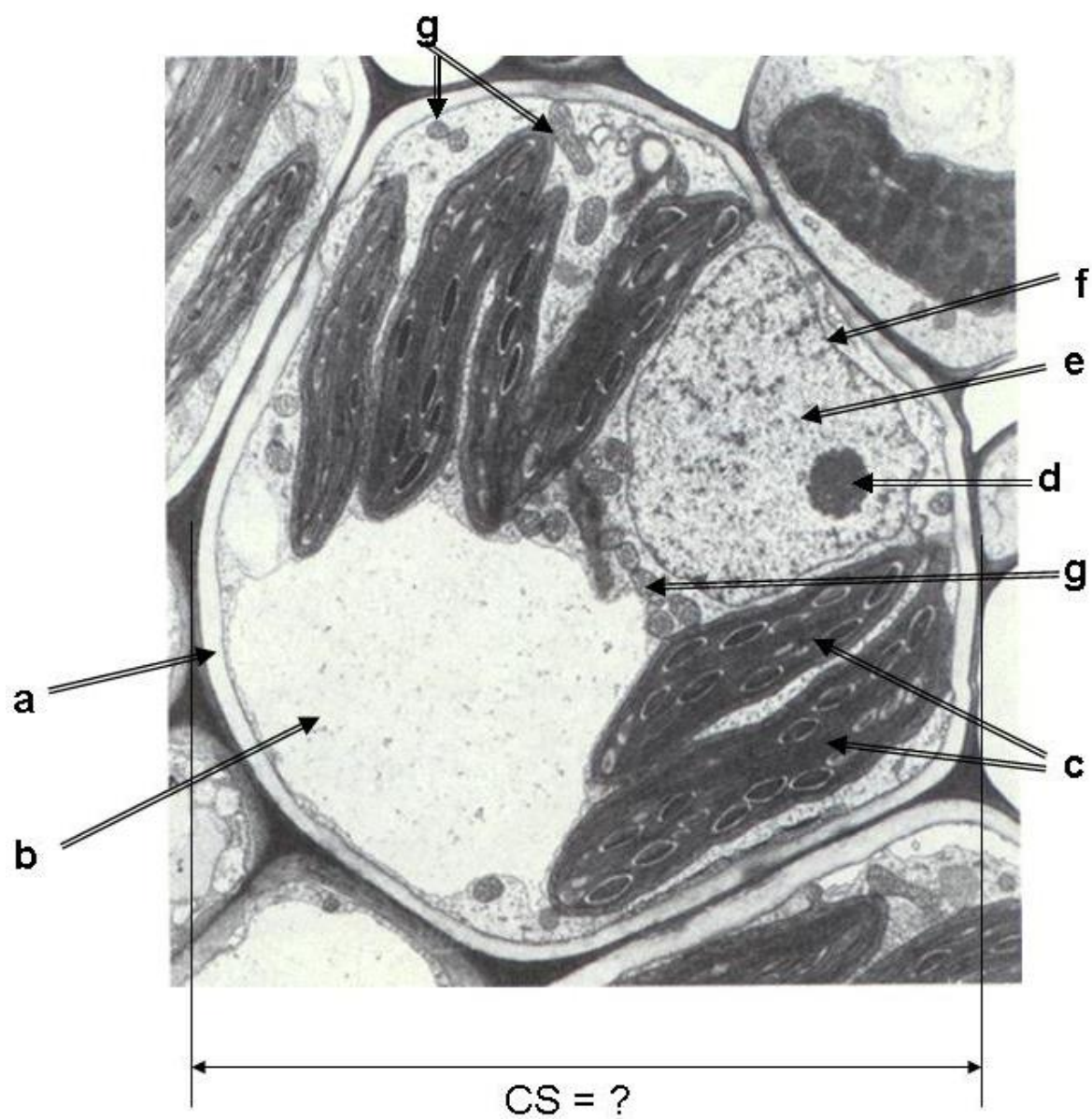


Figure 3

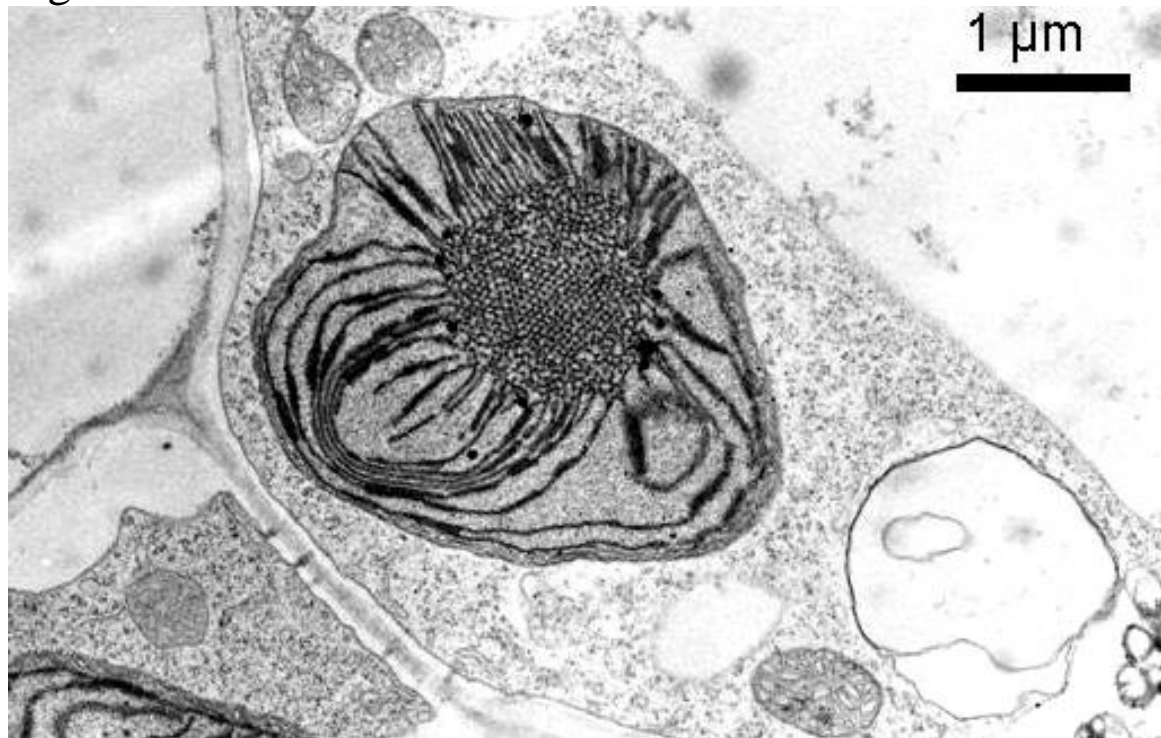


Figure 4

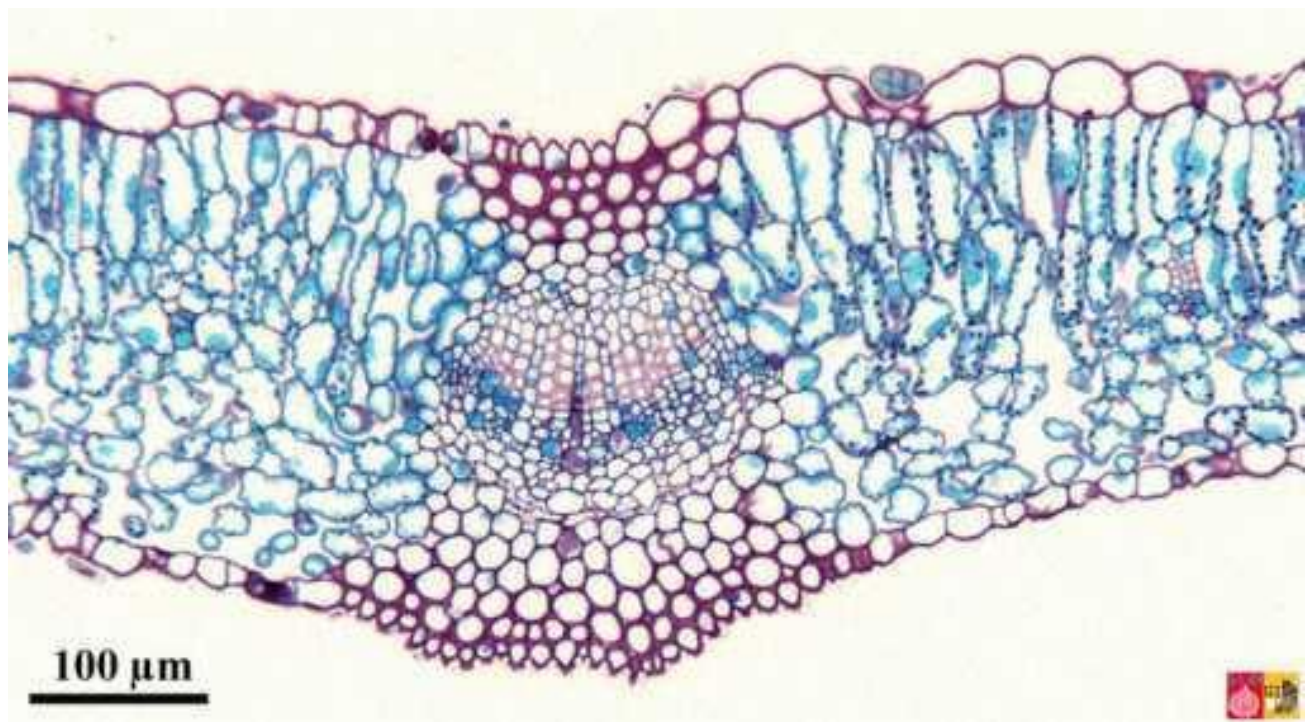


Figure 5

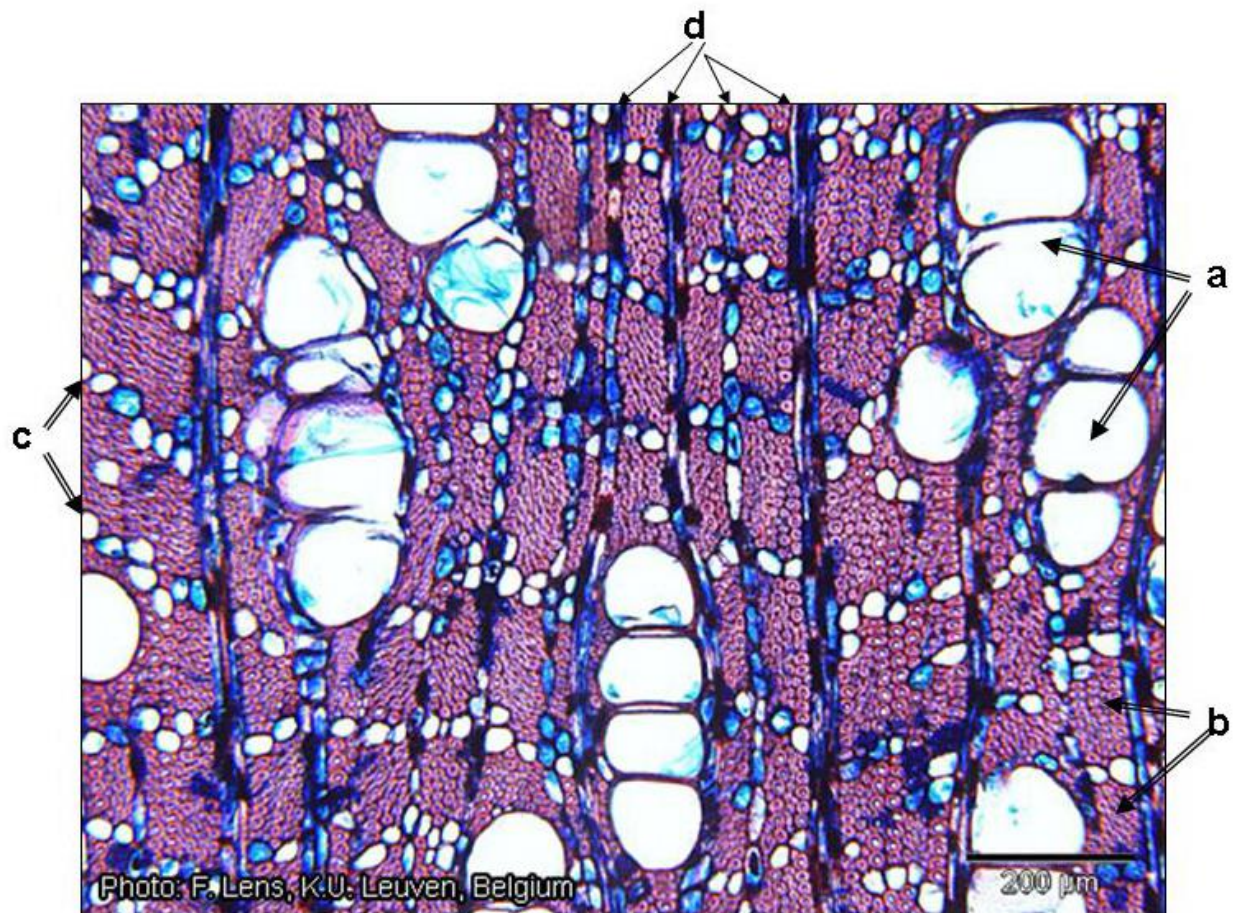


Figure 6

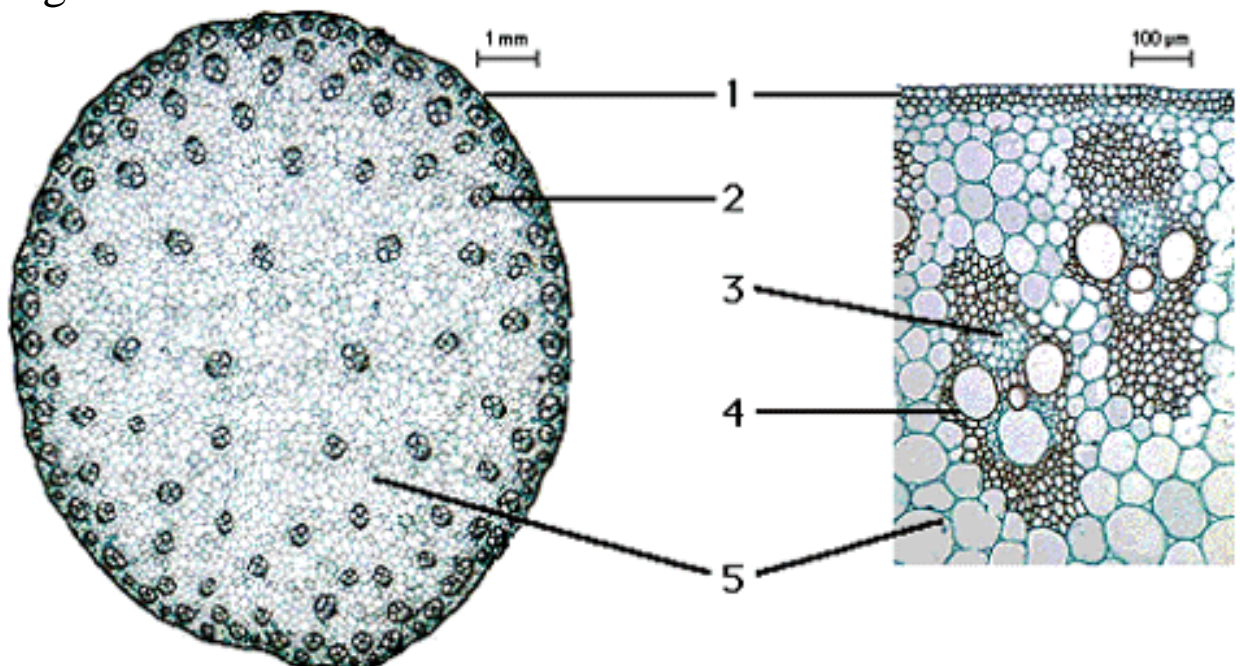


Figure 7

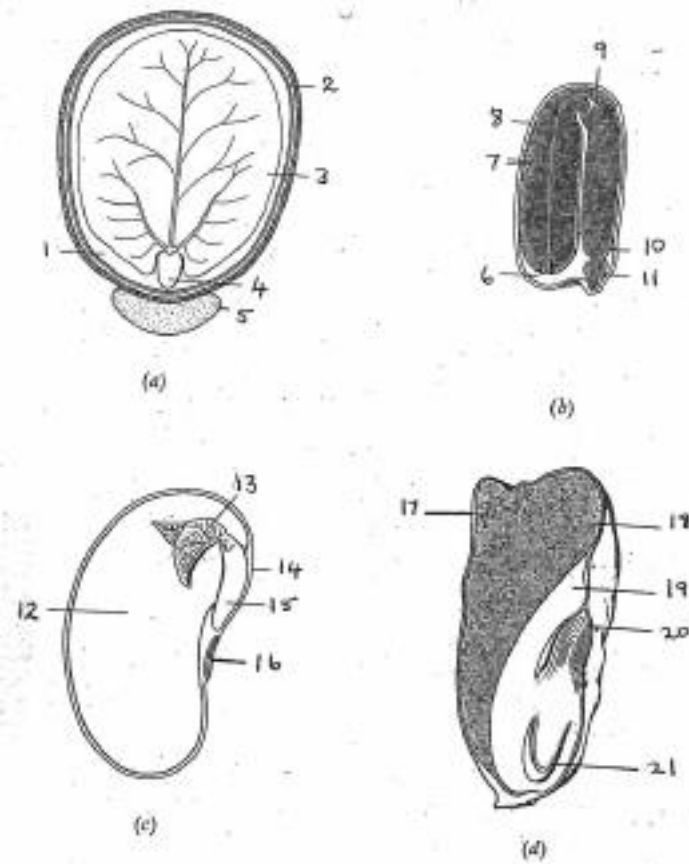


Figure 8

