



UNIVERSITY
OF
JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF BIOTECHNOLOGY
B. Tech

MODULE BTN1YP4
 Plant Biotechnology IV
CAMPUS DFC

NOVEMBER FINAL EXAM

DATE: 11/2014

SESSION: 9:00 – 12:00

ASSESSOR

Dr. N. Niemann

MODERATOR

Mrs. L. O'Reilly

EXTERNAL MODERATOR

Dr B Visser

DURATION: 3 HOURS

MARKS: 180

NUMBER OF PAGES: 3 PAGES

INSTRUCTIONS: THIS QUESTION PAPER MUST BE RETURNED WITH SCRIPT.

REQUIREMENTS:

ANSWER SCRIPT

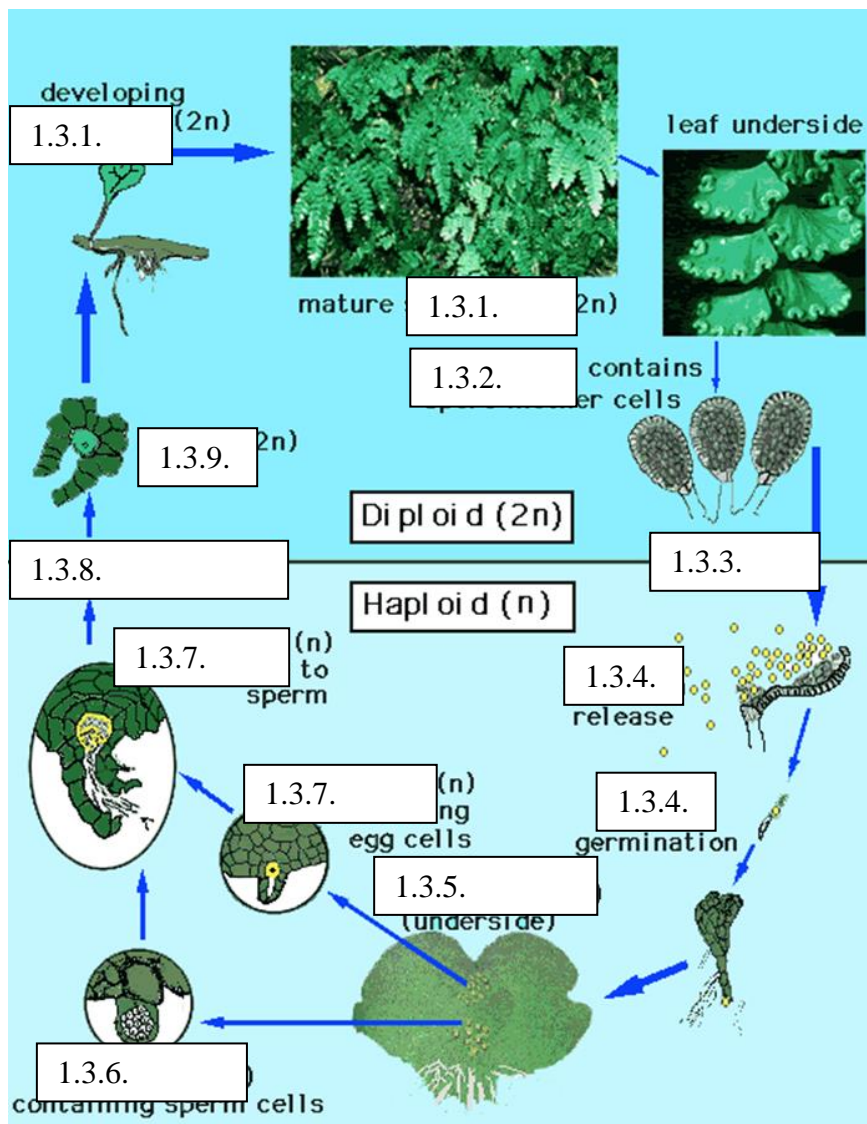
QUESTION 1

1.1. Distinguish between terminal and lateral buds and discuss how plant hormones control how they develop. (6)

1.2. Identify the adaptations that the following plant organs underwent from the following descriptions: (8)

- 1.2.1. Carrots.
- 1.2.2. Leaves that are reduced to limit transpiration – Acacia leaves, for instance.
- 1.2.3. Buttresses on fig trees.
- 1.2.4. Leaves that assist a plant in climbing.
- 1.2.5. Orchid roots.
- 1.2.6. Roots that pull the root stock deeper into the soil.
- 1.2.7. The symbiotic relationship between fungi and plant roots.
- 1.2.8. Leaf-like stems that can grow indefinitely.

1.3. Provide the missing labels for the following illustration: (9)



1.4. Draw and label a diagram showing how monocot layering should be done. (4)

1.5. Describe how seed can be harvested for propagation purposes. (5)

1.6. Name the method that gardeners use to break seed dormancy when they work ashes from burned plants into the soil in which the seeds are to be planted. (1)

QUESTION 2

- 2.1. Describe how glassware should be cleaned and dried in a plant tissue culture laboratory. (11)
- 2.2. Discuss the use of inorganic nutrients in plant growth media. (6)
- 2.3. Describe the protocol for seed sterilization. (10)
- 2.4. Discuss how Iron can be supplied to a plant in tissue culture medium. (3)
- 2.5. Describe how you would add filter sterilized solutions to growth media. (4)
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- [34]

QUESTION 3

- 3.1. Discuss the concept of root culture. (7)
- 3.2. Draw a simple diagram showing the stages that any type of micropropagation has to go through. (11)
- 3.3. List four problems that have to be overcome to successfully produce artificial seeds. (4)
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- [22]

QUESTION 4

- 4.1. Discuss why platform shakers are important in liquid cell culture. (5)
- 4.2. Explain what biotransformation is. (6)
- 4.3. Discuss what haploids are, why we use them and list the two ways of obtaining them. (5)
- 4.4. List five problems associated with haploid production. (5)
- 4.5. List and describe four staining methods to determine whether protoplasts are viable. (9)
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- [30]

QUESTION 5

- 5.1. Relate somaclonal variability to resistance stability. (9)
- 5.2. List and describe three forms of germplasm storage. (10)
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- [19]

QUESTION 6

- 6.1. List four ways in which gene expression can be controlled at transcriptional level. (4)
- 6.2. Describe the chondriome in plants. (7)
- 6.3. Explain in general terms how we insert new genes into plants. (6)
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- [17]

QUESTION 7

- 7.1. Describe the effect that the *Rol* gene has on successfully transformed plant cells. (4)
- 7.2. List the advantages and disadvantages of *Agrobacterium* transformations. (8)
- 7.3. Describe the liposomes used in liposome mediated transformation. (3)
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- [15]

QUESTION 8

- 8.1. Explain how phytoalexins are being used in plant transformation work. (5)
- 8.2. Describe what effect drought has on plants. (5)
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- [10]

TOTAL: 180