



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH AND APPLIED SCIENCES**

**DEPARTMENT OF NATURAL AND APPLIED SCIENCES**

<b>QUALIFICATION: BACHELOR OF SCIENCE</b>	
<b>QUALIFICATION CODE: 07BOSC</b>	<b>LEVEL: 6</b>
<b>COURSE NAME: PLANT STRUCTURE AND FUNCTION</b>	<b>COURSE CODE: PSF602S</b>
<b>SESSION: NOVEMBER 2019</b>	<b>PAPER: THEORY</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 100</b>

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
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<b>MODERATOR:</b>	PROF PERCY CHIMWAMUROMBE

<b>INSTRUCTIONS</b>	
<ol style="list-style-type: none"><li>1. Write clearly and neatly</li><li>2. Number the answers clearly</li><li>3. All written work <b>MUST</b> be done in blue or black ink</li><li>4. No books, notes and other additional aids are allowed</li><li>5. Mark all answers clearly with their respective question numbers</li></ol>	

**PERMISSIBLE MATERIALS**

None

**THIS QUESTION PAPER CONSISTS OF 5 PAGES**  
(Including this front page)

**QUESTION 1:**

**Multiple choices**

[5]

- 1.1 Which of the following soil minerals is most likely leached away during a hard rain? (1)
- a)  $\text{Na}^+$
  - b)  $\text{K}^+$
  - c)  $\text{Ca}^{++}$
  - d)  $\text{NO}_3^-$
- 1.2 Which of the following represents the correct order in the phytochrome signal transduction pathway? 1. red light; 2. light-responsive gene is switched on (or off); 3. movement of Pfr to nucleus; 4. conversion of Pr to Pfr; 5. formation of PFr-PIF3 complex that is bound to promoter region. (1)
- a) 1, 3, 5, 4, 2
  - b) 1, 5, 3, 2, 4
  - c) 1, 2, 3, 4, 5
  - d) 1, 4, 3, 5, 2
- 1.3 Which signaling molecule triggers the release of volatile substances that attract parasitic wasps to plant-eating caterpillars? (1)
- a) phytochrome
  - b) jasmonic acid
  - c) auxin
  - d) methyl salicylate
- 1.4 The coiling of a morning glory stem around a fence post is an example of; (1)
- a) phototropism
  - b) chemotropism
  - c) thigmotropism
  - d) a thigmonastic movement
- 1.5 Which is NOT a physiological change related to photoperiodism? (1)
- a) seed germination
  - b) root branching
  - c) breaking bud dormancy
  - d) onset of senescence

**QUESTION 2:**  
**Fill in the blanks**

[3]

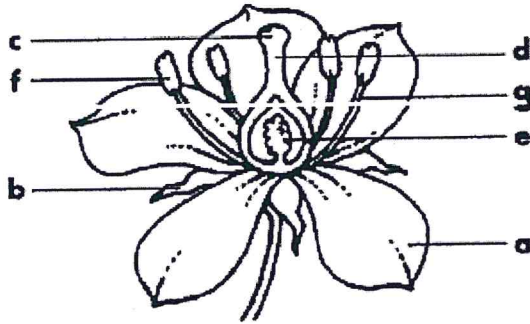


Figure - 1

- 2.1 Refer to the diagram (figure 1) above. The structure labelled f when they are grouped is called the \_\_\_\_\_ . (1)
- 2.2 A long-day plant will flower when \_\_\_\_\_ are shorter than a specific number of hours. (1)
- 2.3 The rapid folding of the leaves of a sensitive plant are the result of a(n) \_\_\_\_\_. (1)

**QUESTION 3:**  
**Define the following terms**

[3]

- 3.1 Stele (1)
- 3.2 Imbibition (1)
- 3.2 Sub soil (1)

**QUESTION 4:**  
**Distinguish between the pairs of the following terms.**

[8]

- 4.1 Complete; incomplete flower (2)
- 4.2 Mycorrhizae; root nodules (2)
- 4.3 Transpiration; guttation (2)
- 4.4 Humus; loam (2)

**QUESTION 5:**

**One-sentence answers**

**[3]**

- 5.1 From which layer does the vascular cambium originate? (1)
- 5.2 If you wanted to increase the cation exchange and water retention capacity of loamy soil, what should you do? (1)
- 5.3 What is wood of the stem made of? (1)

**QUESTION 6:**

**Short questions**

**[24]**

- 6.1 Write two observations about the seed in the following picture (figure 2). (2)

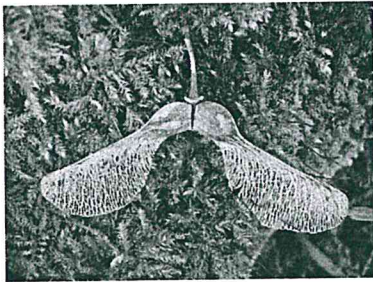


Figure - 2

- 6.2 Identify four environmental factors or conditions that are required for the germination of at least some seeds. (2)
- 6.3 Explain any five terms related to the margin of leaf and include a sketch. (5)
- 6.4 Describe at least five leaves that are modified to perform uncommon functions by giving examples of several adaptations. (5)
- 6.5 Mention any five uses of stems that is used by human beings for day today life. (5)
- 6.6 Explain the types of seed that are dispersed by animals. (5)

**QUESTION 7:**

**Longer questions**

**[18]**

- 7.1 Explain the chemical communication process involved in establishment of plant partnerships with mycorrhiza fungi and why this is important. (8)
- 7.2 Explain the types of simple fleshy fruits with example. (10)

**QUESTION 8:**

[8]

**Structures and functions**

- 8.1 Draw the internal structure of monocot seeds and label its parts. (4)
- 8.2 Use the diagram (figure 3) to answer each question. The diagram below shows the xylem, sieve tube elements and companion cells that are found in plant.

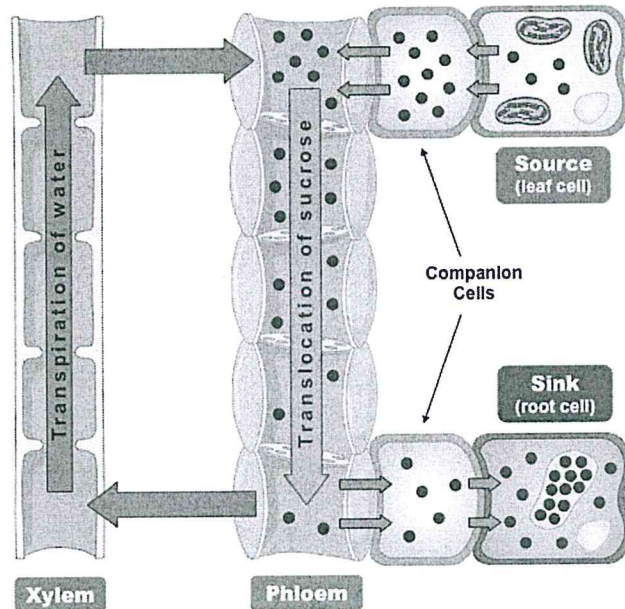


Figure 3

- 8.2.1 Give two ways in which the contents of sieve tube elements are different from those of companion cells. (2)
- 8.2.2 Explain the importance of plasmodesmata between the sieve tube elements and the companion cells. (1)
- 8.2.3 Phloem tissue is found in close association with xylem tissue. Explain the importance of this close association. (1)

**QUESTION 9:**

**Essay question**

[28]

- 9.1 Describe the internal structure of a dicot stem. Draw its labelled diagram. (15)
- 9.2 Explain pollen tube growth and embryo sac development and how the two form an embryo. (13)

**THE END**