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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

Bachelor of Science in Applied Sciences
First Year – Semester I Examination – July/August 2023

BOT 1202 – FUNCTIONAL PLANT ANATOMY AND BASIC WOOD SCIENCE

For official use only						
Marks						
Question 1 200	Question 2 100	Question 3 100	Question 4 100	Total 400	Average 100	Final %

Time: Two (02) hours

Answer the COMPULSORY QUESTION and TWO (02) of the optional questions.

Compulsory Question: [Approximate time allocation is **ONE (01)** hour]

1. **Answer ALL questions. Underline the most suitable answer** using a **pen. No marks will be given for multiple responses.** **(08 x 25 = 200 marks)**

a) A covering of any kind of hair on a plant is known as an
   i. exodermis.
   ii. indumentum.
   iii. aerenchyma.
   iv. epiblema.

b) An isolated plant cell that differs from neighbouring tissues is referred to as
   i. a sclereid.
   ii. a scale.
   iii. an idiobalst.
   iv. an aerenchyma.

c) Epistomatic leaves are found in the
   i. coconut.
   ii. Nymphaea.
   iii. potato.
   iv. mango.

d) Modification of the parenchyma to form a spongy tissue with air channels in the leaves, stems and roots of some plants, which allows exchange of gases between the shoot and the root is
   i. chlorenchyma.
   ii. sclerenchyma.
   iii. prosenchyma.
   iv. aerenchyma.

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e) The epidermis and cork of plants are
   i. mechanical tissues.
   ii. meristematic tissues.
   iii. protective tissues.
   iv. conductive tissue.

f) Bulliform cells can be seen in the leaf epidermis of
   i. *Nymphaea nouchali*.
   ii. *Oryza sativa*.
   iii. *Dipterocarpus zeylanicus*.
   iv. *Mangifera indica*.

g) A bicollateral vascular bundle is one
   i. that has either a phloem strand or a xylem strand.
   ii. in which both xylem and phloem are present with the phloem towards the centre.
   iii. in which both xylem and phloem are present with the xylem towards the periphery.
   iv. in which both xylem and phloem are present with the phloem on both sides of the xylem.

h) Stinging hairs, lithocysts and multiple epidermis are evident in the leaves of
   i. *Nerium oleander*, *Ficus elastica* and *Laportea interrupta*.
   ii. *Ficus elastica*, *Laportea interrupta* and *Nerium oleander*.
   iii. *Laportea interrupta*, *Ficus elastica* and *Nerium oleander*.
   iv. *Ficus elastica*, *Nerium oleander* and *Laportea interrupta*.

j) Passage cells are found in the
   i. phloem of stems.
   ii. endodermis of roots.
   iii. pericycle of stems.
   iv. xylem of roots.

k) Cell division occurs only along one plane in
   i. rib meristem.
   ii. mass meristem.
   iii. plate meristem.
   iv. vascular cambium.

l) The vascular bundles in typical monocot stems are
   i. closed, conjoint, collateral and endarch.
   ii. closed, conjoint, collateral and exarch.
   iii. open, conjoint, collateral and endarch.
   iv. open, conjoint, collateral and exarch.

m) Chlorenchyma is known to develop in the
   i. coenobium of *Volvox*.
   ii. filament of *Spirogyra*.
   iii. sporophyte of *Anthoceros*.
   iv. pollen tube of *Pinus*.

n) The function of companion cells is to
   i. protect phloem from pathogenic agents.
   ii. produce new sieve elements.
   iii. provide mechanical support to phloem.
   iv. load sugar and amino acids into sieve elements.

o) The region between the epidermis and stele in typical dicot stems is known as the
   i. hypodermis.
   ii. pericycle.
   iii. cortex.
   iv. endodermis.

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p) An organized and differentiated cellular structure of plants having cytoplasm but no nucleus is
   i. pollen tube.
   ii. laticifer.
   iii. sieve tube.
   iv. hydathode.

q) Select the **incorrect** statement.
   i. The outer bark is also known as the secondary cortex.
   ii. Phellem, phellogen and phelloderm jointly constitute the periderm.
   iii. The rhytidome is the most familiar part of bark, being the outer peeling off layer that covers the trunks of trees.
   iv. The living phloem and periderm are together termed the bark.

r) Generally in conifers, xylem is made up of
   i. tracheids and fibres.
   ii. vessels and fibres.
   iii. tracheids and parenchyma.
   iv. vessels and parenchyma.

s) Salt secreting glands are not found in
   i. *Acanthus ilicifolius*.
   ii. *Acrostichum aureum*.
   iii. *Aegiceras corniculatum*.
   iv. *Avicennia marina*.

t) Dendritic trichomes are usually
   i. unicellular and branched.
   ii. unicellular and unbranched.
   iii. multicellular and branched.
   iv. multicellular and unbranched.

u) A type of wood grain that has very tight and uniform curls and is used in many stringed musical instruments is
   i. Quilted wood grain.
   ii. Snakewood wood grain.
   iii. Fiddleback wood grain.
   iv. Bird's-eye wood grain.

v) Suberin is associated with the walls of the cells in the
   i. pericycle.
   ii. endodermis.
   iii. exodermis.
   iv. phelloderm.

w) The reaction wood of dicots and conifers are respectively,
   i. hard wood and soft wood.
   ii. tension wood and compression wood.
   iii. late wood and early wood.
   iv. spring wood and autumn wood.

x) Select the **incorrect** statement about syndetocheilic type stoma in gymnosperms.
   i. The two guard cells and the subsidiary cells are all derived from a single mother cell.
   ii. Based on ontogeny, the perigynous type stoma in angiosperms is similar to the syndetocheilic type.
   iii. Based on ontogeny, the mesogynous type stoma in angiosperms is similar to the syndetocheilic type.
   iv. *Gnetum gnemon* and *Welwitschia mirabilis* possess syndetocheilic type stoma.

y) Lateral roots originate from the root
   i. pericycle.
   ii. hypodermis.
   iii. endodermis.
   iv. epidermis.

z) Select the **correct** statement about the origin of vascular cambium. It is
   i. primary in dicot stems.
   ii. secondary in dicot stems.
   iii. primary in dicot roots.
   iv. secondary in dicot roots.

Optional Questions: [Approximate time allocation is **ONE (01)** hour]

Answer any TWO (02) questions.

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2. Describe the anatomical diversity of parenchyma used in wood identification. **(100 marks)**

3. "Angiosperm leaves possess a wide stomatal complex anatomy." Justify the above statement using suitable examples and illustrations. **(100 marks)**

4. a) Describe briefly the following.
   i. Sapwood and heartwood. **(20 marks)**
   ii. Spring wood and autumn wood. **(20 marks)**
   iii. Softwood and hardwood. **(12 marks)**

   b) Discuss briefly **eight (08)** advantages and **eight (08)** problematic factors in timber usage. **(48 marks)**

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