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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Applied Sciences
First Year – Semester I Examination – May 2022

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 <u>COMPULSORY QUESTION</u> and <u>TWO (02)</u> of the optional questions.

<u>Compulsory Question</u>: [Approximate time allocation is **<u>ONE (01)</u>** hour]

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

   a) With reference to bark, select the incorrect statement? It
      i. is a tissue external to vascular cambium.
      ii. reduces water loss.
      iii. is a tissue that is completely living.
      iv. protects the tree from infection.

   b) Velamen cells can be seen in the
      i. circular leaves of onions.
      ii. petioles of *Nymphaea.*
      iii. roots of epiphytic orchids.
      iv. seed coat of beans.

   c) The external protective tissues of plants are
      i. cortex and epidermis.
      ii. cork and cortex.
      iii. pericycle and cortex.
      iv. epidermis and cork.

   d) Bulliform cells can be seen in the leaf epidermis of
      i. *Nymphaea nouchali.*
      ii. *Oryza sativa.*
      iii. *Dipterocarpus zeylanicus.*
      iv. *Mesua ferrea.*

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e) 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 xylem 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.

f) For a study of typical secondary growth in plants, which one of the following pairs is suitable?
   i. Mahogany and *Pinus*
   ii. *Gnetum* and *Nephrolepis*
   iii. Coconut and *Sellaginella*
   iv. *Aristolochia* and Sunflower

g) Alternation of long cells with pairs of short cork and silica cells are seen in the epidermis of the stems of
   i. cotton.
   ii. sugarcane.
   iii. potato.
   iv. grape.

h) Passage cells are found in the
   i. phloem of monocot stems.
   ii. endodermis of roots.
   iii. epidermis of C_4 leaves.
   iv. xylem of dicot stems.

j) Cell division occurs in all planes in
   i. file or rib meristem.
   ii. mass meristem.
   iii. plate meristem.
   iv. apical meristem.

k) Vascular bundles in dicot 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.

l) Chlorenchyma is known to develop in the
   i. cytoplasm of *Chlamydomonas*.
   ii. filament of Spirogyra.
   iii. capsule of the sporophyte of *Anthoceros*.
   iv. pollen tube of *Pinus*.

m) The major function of sieve tubes in plants is
   i. mechanical support.
   ii. translocation of organic solutes.
   iii. translocation of water and minerals.
   iv. food storage.

n) The cortex is the region found between
   i. epidermis and stele.
   ii. pericycle and endodermis.
   iii. endodermis and pith.
   iv. endodermis and vascular bundle.

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o) The three layers, *viz*., phellem, phellogen and phelloderm jointly constitute the
   i. secondary cortex.
   ii. rhytidome.
   iii. periderm.
   iv. bark.

p) In a longitudinal section of a root, starting from the tip upward, the four zones observed in the correct order are:
   i. root cap, cell division, cell elongation, cell maturation and differentiation
   ii. root cap, cell division, cell maturation and differentiation, cell elongation
   iii. cell division, cell elongation, cell maturation and differentiation, root cap
   iv. cell division, cell maturation and differentiation, cell elongation, root cap

q) In gymnosperms (except in *Gnetum*), xylem is made up of
   i. tracheids and vessels.
   ii. vessels and fibres.
   iii. tracheids and parenchyma.
   iv. vessels and parenchyma.

r) A major characteristic of typical monocot roots is the presence of
   i. scattered vascular bundles.
   ii. closed vascular bundles.
   iii. cambium sandwiched between phloem and xylem along the radius.
   iv. open vascular bundles.

s) When exposed, which of the following wood will decay faster?
   i. Sapwood
   ii. Softwood
   iii. Wood with lot of fibres
   iv. Heartwood

t) Which of the following combinations of vessel element characteristics are important for the movement of water in the xylem?
   i. Rigid cell walls, cell death at maturity, end walls absent
   ii. Rigid cell walls, reduction in size of plastids and mitochondria, end walls present
   iii. Rigid cell walls, living cell membranes, end walls absent
   iv. Flexible cell walls, cell death at maturity, end walls absent

u) The waxy substance associated with the walls of the cork cells is
   i. lignin.
   ii. hemicellulose.
   iii. cutin.
   iv. suberin.

v) Presence of conjoint collateral closed vascular bundles are evident in the stem of
   i. apple.
   ii. mango.
   iii. coconut.
   iv. teak.

w) An organized and differentiated cellular structure of plants having cytoplasm but no nucleus is
   i. stellate parenchyma.
   ii. xylem parenchyma.
   iii. sieve tube.
   iv. lamellar collenchyma.

x) Select the tissue which is generally absent in typical aerial roots.
   i. Chlorenchyma
   ii. Sclerenchyma
   iii. Collenchyma
   iv. Parenchyma

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y) Pericycle of roots produces
   i. root caps.
   ii. lateral roots.
   iii. root hairs.
   iv. adventitious roots.

z) Which of the following plant cells would not show totipotency?
   i. Pith cells
   ii. Aerenchyma cells
   iii. Sieve tube members
   iv. Collenchyma cells

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

Answer any TWO (02) questions.

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2. Describe briefly the origin, role/function and significance of secondary lateral cambia of dicotyledonous stems. **(100 marks)**

3. "Stems of some dicotyledonous plants possess atypical primary and/or secondary growth." Justify this statement. **(100 marks)**

4. Write short notes on the following.
   a) Wood chemistry **(34 marks)**
   b) Reaction wood **(34 marks)**
   c) Plastids **(32 marks)**

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