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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Applied Sciences
First Year – Semester I Examination – March 2021

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 <u>the 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>.** **(25 x 08 = 200 marks)**

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

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

   c) Which meristem helps in increasing the girth of stems?
      i. Lateral meristem
      ii. Intercalary meristem
      iii. Primary meristem
      iv. Apical meristem

   d) Cork cambium and vascular cambium are
      i. parts of secondary xylem and phloem.
      ii. parts of pericycle.
      iii. lateral meristems.
      iv. apical meristems.

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e) Reaction wood of angiosperms (dicots) and gymnosperms are respectively
   i. Compression wood and tension wood.
   ii. Compression wood and densified wood.
   iii. Tension wood and compression wood.
   iv. Tension wood and densified wood.

f) 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.

g) A bicollateral vascular bundle is characterized by
   i. phloem being sandwitched between xylem, and is found in the stems of pumpkin.
   ii. xylem being sandwitched between phloem, and is found in the stems of pumpkin.
   iii. phloem being sandwitched between xylem, and is found in the stems of cowpea.
   iv. xylem being sandwitched between phloem, and is found in the stems of cowpea.

h) Geometric mosaic of wood pieces used for decorative effect is referred to as
   i. plywood.
   ii. parquetry.
   iii. densified-wood.
   iv. marquetry.

j) Vessels are not found in the genus
   i. *Gnetum*.
   ii. *Tectona*.
   iii. *Pinus*
   iv. *Selaginella*

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

l) Diffuse porous wood is a characteristic of hardwood plants growing in
   i. tundra climate.
   ii. temperature climate.
   iii. alpine climate.
   iv. tropical climate.

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

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

o) Four radial vascular bundles are (tetrarch condition is) typically found in
   i. dicot roots.
   ii. monocot roots.
   iii. dicot stems.
   iv. monocot stems.

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 enlargement, cell maturation
   ii. root cap, cell division, cell maturation, cell enlargement
   iii. cell division, cell enlargement, cell maturation, root cap
   iv. cell division, cell maturation, cell enlargement, root cap

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q) 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*

r) Passage cells (thin-walled cells) are found in
   i. phloem elements that serve as entry points for substance to transport to other plant parts.
   ii. testa of seeds to enable emergence of growing embryonic axis during seed germination.
   iii. central region of style through which the pollen tube grows towards the ovary.
   iv. endodermis of roots facilitating rapid transport of water from cortex to pericycle.

s) 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

t) Which of the following statement is true?
   i. Vessels are unicellular with narrow lumen.
   ii. Vessels are multicellular with wide lumen.
   iii. Tracheids are unicellular with wide lumen.
   iv. Tracheids are multicellular with narrow lumen.

u) The external protective tissues of plants are
   i. Cortex and epidermis
   ii. Cork and cortex
   iii. Pericycle and cortex
   iv. Epidermis and cork

v) As a tree grows older, which of the following increases more rapidly in thickness?
   i. Heart wood
   ii. Sap wood
   iii. Phloem.
   iv. Cortex.

w) Vascular bundles in monocot stems are
   i. Closed, conjoint, collateral and endarch.
   ii. Open, conjoint, collateral and endarch.
   iii. Closed, conjoint, collateral and exarch.
   iv. Open, conjoint, collateral and exarch.

x) In gymnosperms, xylem is generally made up of
   i. tracheids and fibres.
   ii. tracheids and vessels.
   iii. vessels and fibres.
   iv. parenchyma and vessels.

y) 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.

z) Aliform-confluent parenchyma is characteristic to the wood of
   i. *Artocarpus heterophyllus* (Moraceae).
   ii. *Diospyros ebenum* (Ebenaceae).
   iii. *Pericopsis mooniana* (Fabaceae).
   iv. *Tectona grandis* (Lamiaceae).

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

Answer TWO (02) questions.

2. a) Illustrate schematically the different types of steles present in plants, emphasizing the main features adopted to classify in each step. **(70 marks)**

   b) Outline the distribution of stele diversity found among the major groups in Kingdom Plantae. **(30 marks)**

3. a) Explain the types of stomatal complexes in seed plants based on their ontogeny (*i.e.*, on the basis of their development). **(45 marks)**

   b) Outline the anatomy of different stomatal complexes found in monocot plants. **(15 marks)**

   c) Describe briefly the **five (05)** main categories of stomatal distribution recognized in plants. **(30 marks)**

   d) State the major cell types which are arranged in a non-random fashion in an epidermis of a typical leaf. **(10 marks)**

4. a) Illustrate the diversity of ray parenchyma in wood. **(50 marks)**

   b) Describe briefly the anatomy of onion (*Allium cepa* L.) leaf. **(50 marks)**

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