Index No.: .....

RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
First Year – Semester I Examination – June/July 2018

BIO 1207 – PLANT ANATOMY

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 only the most suitable answer. Marks will be deducted for multiple responses.** **(200 marks)**

   a) Which one has perforation plates?
      i. Tracheid
      ii. Vessel
      iii. Fibre
      iv. Sclereid

   b) Major part of wood of old dicot stem is filled with tannins, resins and gums. This part is called
      i. Heartwood.
      ii. soft wood.
      iii. sap wood.
      iv. hard wood.

   c) Match the following and choose the correct option from below:

A. cuticle	B. bulliform cells	C. stomata	D. epidermis
P. guard cells	Q. single layer,	R. waxy layer	S. empty colourless cell

   Correct answer is
      i. A-R, B-S, C-P, D-Q.
      ii. A-P, B-Q, C-R, D-S.
      iii. A-R, B-Q, C-S, D-P.
      iv. A-R, B-Q, C-P, D-S.

   d) 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.

   e) Which combinations of characteristics of a vessel element are most important for water movement 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.

f) Trichomes of plants take part in
   i. transpiration and exchange of gas.
   ii. protection and reduction of transpiration.
   iii. exudation of water drops.
   iv. desiccation.

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

h) Vascular bundles in dicot stem are
   i. closed, collateral, endarch.
   ii. closed, collateral, exarch.
   iii. open, collateral, endarch.
   iv. open, collateral, exarch.

j) The living tissue that provides support to the growing parts of the plant is
   i. sclerenchyma.
   ii. collenchyma.
   iii. parenchyma.
   iv. fibres.

k) Vascular bundles in monocotyledons are considered closed because
   i. a bundle sheath surrounds each bundle.
   ii. xylem is surrounded all around by phloem.
   iii. cambium is absent.
   iv. there are no vessels with perforations.

l) Root hairs develop from the region of
   i. elongation.
   ii. root cap.
   iii. meristematic activity.
   iv. maturation.

m) The tyloses
   i. originate in the lumen of vessels.
   ii. characterize the sapwood.
   iii. are extensions of xylem parenchyma cells into vessels.
   iv. are linked to the ascent of sap through xylem vessels.

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

o) Give the correct order of the components with reference to their arrangement from the outer side to inner side in a woody dicot stem: (A) secondary cortex (phelloderm), (B) wood, (C) secondary phloem, and (D) cork (phellem). The correct order is
   i. (C), (D), (B), (A).
   ii. (A), (B), (D), (C).
   iii. (D), (A), (C), (B).
   iv. (D), (C), (A), (B).

Index No.: .....

p) A major characteristic of the monocot root is the presence of
   i. scattered vascular bundles.
   ii. vasculature without cambium.
   iii. cambium sandwiched between phloem and xylem along the radius.
   iv. open vascular bundles.

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

r) Essentially absent in typical roots
   i. Chlorenchyma
   ii. Collenchyma
   iii. Sclerenchyma
   iv. Parenchyma

s) Interfascicular cambium develops from the cells of
   i. Endodermis.
   ii. pericycle.
   iii. medullary rays.
   iv. xylem parenchyma.

t) Bicollateral vascular bundles are common in the stems of
   i. *Cucurbita*.
   ii. *Ficus*.
   iii. *Hibiscus*.
   iv. *Pinus*.

u) The cells with excessive lengths are common in the tissue of
   i. parenchyma.
   ii. sclerenchyma.
   iii. collenchyma.
   iv. epidermis.

v) Phyllode is a
   i. flattened leaf-like stem.
   ii. modified petiole into a leaf-like structure.
   iii. flattened branch resembling and functioning as a leaf.
   iv. modified horizontal underground stem.

w) Pith is well developed in
   i. *Canna* root.
   ii. *Manihot* petiole.
   iii. both the above.
   iv. none of the above.

x) A bicollateral vascular bundle is one
   i. which has either 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 the both sides of xylem.

y) Cell division typically occurs only in the meristematic regions of plants. In which region would cell division does not occur?
   i. Shoot apex
   ii. Wood
   iii. Expanding leaf
   iv. Cambium between wood and bark

z) You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will you use to distinguish between the two?
   i. Cortical cells
   ii. Secondary xylem
   iii. Secondary phloem
   iv. Protoxylem

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

Answer TWO (02) questions.

2. Outline the **diversity of simple permanent tissues** in plants, and list their functions. **(100 marks)**

4. a) Outline the anatomical diversity in plant **trichomes**. **(60 marks)**

   b) Explain the **role of trichomes** in the success of plants, highlighting **five (05)** different instances. **(40 marks)**

5. Distinguish the following pairs.

   a) Integument and piliferous layer **(20 marks)**

   b) Heartwood and sapwood **(20 marks)**

   c) Diffuse-porous wood and ring-porous wood **(20 marks)**

   d) Bundle-cap and Bundle-sheath **(20 marks)**

   e) Ray parenchyma and axial parenchyma **(20 marks)**

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