



MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR
FOURTH YEAR FIRST SEMESTER**

**SCHOOL OF NATURAL RESOURCES AND
ANIMAL SCIENCES
THE DEGREE OF BACHELOR OF SCIENCE IN
FOREST ECOSYSTEM**

COURSE CODE: FOR 4132

COURSE TITLE: FOREST MENSURATION

DATE: 16TH DECEMBER 2019

TIME: 1430-1630 HRS

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in section **A** and any other **THREE** in section **B**.

This paper consists of 3 printed pages. Please turn over

SECTION A (25 MARKS): ANSWER ALL QUESTIONS

1(a) Briefly discuss the importance of measuring forests (4Marks)

(b) Give the factors that affect tree measurements (3Marks)

(c) Describe the three common stand structure classes (6Marks)

2 (a) A tree is standing on a flat ground. If an observer standing at a distance of 28 m from the base of tree. Measures with the help of an Abney's level, angles of 45° and 20° respectively to the top and base of the tree

Calculate the height of the tree with suitable diagram (5 marks)

(b) List the factors considered when choosing tree measurement instrument (3Marks)

(c) Briefly discuss the sources of errors in tree height measurement and how to minimize them (4Marks)

SECTION B (45 MARKS): ANSWER ANY THREE QUESTIONS

3 (a) A piece of *Pinus patula* log 3m long, diameter of 0.3m and bark thickness of 2cm. Assuming no taper, Calculate the volume bark in M^3 (5Marks)

(b) Briefly discuss precaution measures used to obtain reliable readings when sampling bark thickness without damaging the tools. (6Marks)

(c) Discuss four factors that can be used to assess forest-site quality (4Marks)

4 A homogenous stand has 1000 trees with average height of 10 m and dbh 0.4 m.

(a) Compute the total volume in this stand assuming conoid formation (4Marks)

(b) Calculate the volume assuming paraboloid formation (4Marks)

(c) Calculate the total crown volume given the average crown width 5 m and depth as 8 m assuming all trees are cone shaped (7Marks)

5 (a) The volume of a log by Newton's formula is 6.67m^3 . The diameter at the butt end and top end are 78cm and 41cm respectively. If the length of log is 16m. Calculate the diameter of log at the middle **(3 Marks)**

(b) Discuss various Methods of estimating stand volume. **(8 Marks)**

(c) Define absolute form quotient and how it is used in forestry **(4Marks)**

6. Measurements recorded on a felled sample tree of radiata pine are:

Height above ground (m)	Dub (cm)
0.3	22.9
0.8	21.4
1.3	21.0
3.2	17.6
5.8	16.3
7.0	15.2
8.0	13.0
9.0	11.2
11.0	10.6
12.5	7.0
14.0	5.6
16.0	2.8
16.7	0.0

(a) Derive the volume of the section of the bole between 7 and 9 m using Huber's, Smalian's and Newton's formulae respectively. **(12 Marks)**

(b) Explain the variation in (a) above. **(3Marks)**

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