2015/2016 SECOND SEMESTER EXAMINATIONS (SPECIAL/SUPPLEMENTARY)

FOR 221: FOREST MENSURATION

SECTION A (30 marks)

Answer all questions in this section

Q1. "Forest Mensuration is a quantitative discipline that deals with measurements of trees, stands, tree products and non-tree forest products."Explain and give relevant examples. **5 marks**

Q2. Using quantitative examples, demonstrate applications of forest Mensuration in making decisions on the following:

a) Spacing **5 marks**
b) Rotation age **5 marks**
c) Beating up **5 marks**
d) Computing merchantable volume **5 marks**
e) Bark thickness **5 marks**

SECTION B (40 marks)

Answer any two questions from this section

Q3. The following are data from forest stands around Mau Forest Complex

Mean tree DBH (in cm)	Mean tree height (in m)	Mean tree volume (in m^3)
18.5	17.2	0.305
15.1	13.0	0.162
16.2	14.5	0.154
17.5	14.8	0.181
16.5	16.2	0.175
25.0	20.2	1.220

a) Demonstrate whether it is justified or not to apply the combined volume equation $V = b_0 + b_1 D^2 H$ by analysis of scatter points diagramme. **4 marks**
b) Fit the equation **8 marks**
c) Determine the volume of a stand made of 300 trees with a mean tree dbh of 22.0 cm and mean tree height of 18.0 cm. **8 marks**

Q4. a) The biomass equations below describe a forest situation within a dryland ecosystem: Total Biomass (B_t) = $0.006D^{2.01} H^{0.9}$; Merchantable biomass (B_m)= $Bt (1-0.55d^{2.7} D^{-2.5})$. Based on the above relationship, determine the merchantable biomass to a top diameter limit of 10 cm for a tree with D = 35 cm and H = 20 m. **10 marks**

b) Graphically illustrate how tree diameters and heights were measured on a sloping terrain within the above forest **4 marks**

c) The forester used a caliper and a diameter tape interchangeably within the same exercise. Discuss the pros and cons of this practice. **6 marks**

Q5. Using examples, differentiate between the following terms as used in forest mensuration:

a) Absolute Density and ecological density **5 marks**
b) Mean annual increment and periodic annual increment **5 marks**
c) Absolute Form quotient and normal form quotient **5 marks**
d) Site quality and site index. **5 marks**