



MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR**

FOURTH YEAR SECOND SEMESTER

**SCHOOL OF TOURISM AND NATURAL RESOURCE
MANAGEMENT**

BACHELOR OF SCIENCE IN FORESTRY

COURSE CODE: FOR 435E

**COURSE TITLE: FOREST TRANSPORTATION
SYSTEMS**

DATE: 24TH APRIL, 2018

TIME: 08:30-10:30AM

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in section **A**. Answer question **SIX** and any other **TWO** in section **B**.

This paper consists of 4 printed pages. Please turn over.

Section A: Answer ALL QUESTIONS in this section (25 Marks).

Question 1

- i) Discuss the significance of forest transportation **(2 Marks)**
- ii) State any six factors that influence the choice of logging trucks used during forest transportation **(3 marks)**

Question 2

Discuss any five reasons why rail transportation of logs is not commonly used in Kenya **(5 Marks)**

Question 3

- i) Define the following terms as used in landing operations **(2 marks)**
 - i) Hot decks
 - ii) Fleeting
 - iii) Bucking
 - iv) Sorting
- ii) Calculate the number of truckloads of aggregate material needed for the construction of road section that is 19 Km long, 6.5 metres wide with an aggregate depth of 250mm. (Assumption: take gravel weight is 1750 Kg/m³, and that a truck will hold 24 tonnes of gravel). **(3 marks)**

Question 4

- i) Discuss three environmental effects of excavation during forest road and landing constructions **(3 Marks)**
- ii) Differentiate between an arterial road and a secondary road **(2 marks)**

Question 5

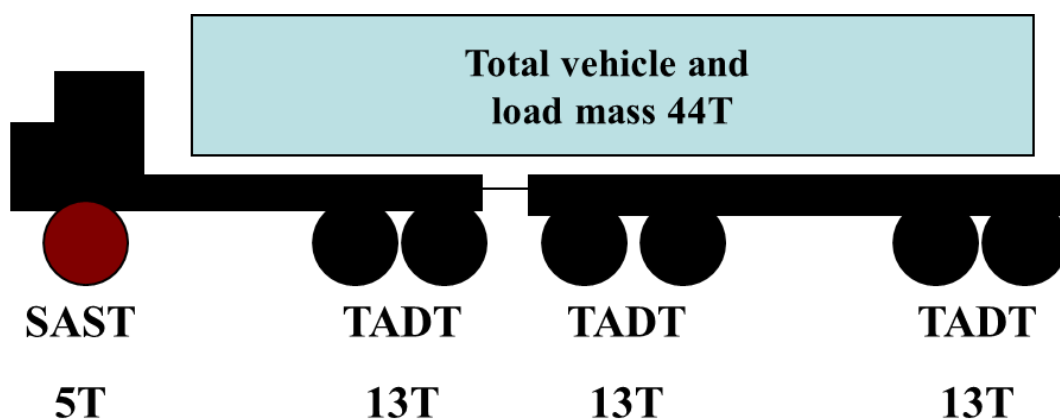
- i) Describe the characteristics of an aggregate material that would make a good layer of a forest road **(2 marks)**
- ii) Discuss why soil modification may be required for a sub-grade soil that is weak and unable to support a road designed for off-highway trucks. **(3 marks)**

Section B: Answer Question SIX and any other TWO questions from this section. (45 Marks)

Question 6 (Compulsory)

- a) State five site features that may be used to determine a road standard **(5 marks)**
- b) Discuss the benefits of a properly constructed forest road to a forest transport company **(5 marks)**
- c) Explain the significance ESA to forest transport companies? **(1 mark)**
 - i) Calculate the total ESA for the truck with configuration shown below. Use the information provided in the Table and chart below. **(2 marks)**

Axle Type	Standard Load kN (T)
SAST	53 (5.4)
SADT	80 (8.2)
TAST	90 (9.2)
TADT	135 (13.7)
TRDT	181 (18.5)
QADT	221 (22.5)



- ii) Explain the effect of increasing the above payload of the truck by 50%? **(2 marks)**

Question 7

- i) State and briefly explain the typical construction stages and equipment used for forest roads **(5 marks)**
- ii) Describe how each of the following impact on vehicle road interaction:
 - a) Static Load
 - b) Vehicle Speed
 - c) Tyre Inflation Pressure
 - d) Tyre Selection
 - e) Road condition factors

Question 8

- i) State the factors that constrain available area for the construction of a landing **(3 marks)**
- ii) Discuss problems associated with poorly designed landing **(4 marks)**
- iii) Discuss all the landing operations, clearly stating the machines involved in each operation **(8 Marks)**

Question 9

- i) Forest products material handling must be technically feasible, financially viable, acceptably safe, and environmentally sound. Discuss. **(12 marks)**
- ii) State three advantages associated with properly planned forest transportation systems. **(3 marks)**

END
