

**MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS 2016/2017 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER**

**SCHOOL OF TOURISM AND NATURAL RESOURCE MANAGEMENT**

**BACHELOR OF SCIENCE IN ENVIRONMENTAL STUDIES (BIOLOGY AND HEALTH)**

**COURSE CODE: FOR 326**

**COURSE TITLE: FOREST MANAGEMENT**

**DATE: 11TH JULY, 2017 TIME: 1100 – 1300HRS**

**INSTRUCTIONS TO CANDIDATES**

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

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

**FOR326\_Forest Management**

**SECTION A: Answer ALL Questions from this section**

1. State any two silvicultural decisions that would be made by a forest manager (1 mark)
2. Explain why a forest manager must incorporate other objectives other than the primary objective during decision making? (2 marks)
3. State the steps involved in forest decision making process. (3 marks)
4. Forests are heterogeneous in nature. State how this aspect poses a serious challenge to a forestry manager. (2 marks)
5. State the type of data you would collect to determine; (4 marks)
6. Individual tree volume
7. Stand volume
8. Linear programming is an analytical tool used by forest managers in decision making. In your own opinion, how would a forest manager apply such analytical tools in an attempt to make optimal decisions?    (3 marks)
9. A harvesting contractor has 500 tree stems that have been felled with which to meet the day’s orders for each of 3 log grades (pruned log volume must exceed 300m3, unpruned sawlog volume must exceed 500m3 and pulplog volume must exceed 200m3). Each stem can be cross-cut into logs in a range of different ways. The harvesting contractor wishes to maximise the value of logs produced.

Characterise the above example by the critical components: (5 marks)

1. Decision to be made
2. Decision maker
3. Objective (s) to be achieved
4. Alternative courses of action
5. Constraints
6. Resource limitations
7. Demands on production
8. State four factors that would determine yield regulation strategy for any forest estate. (2 marks)
9. What is a normal forest? (2 marks)
10. Give three reasons why record keeping is important in forest operations (3 marks)
11. Forestry operations involve a hierarchy of planning over different time horizons and spatial scales. Explain. (3 marks)

**SECTION B: Answer ANY THREE questions from this section. All questions from this section carry equal marks**

1. A forest manager wants to determine whether to fertilize a 1 ha stand or not. Options are to use a nitrogen fertilizer, a phosphorous fertilizer or some combination.

The nitrogen fertilizer is predicted to increase net present value (NPV) by Ksh. 4000 per tonne applied, the phosphorus fertilizer by Ksh. 5000 per tonne applied.

However there are various constraints in terms of resource limitations;

* A budget limit of Ksh. 12,000. The total cost of applying nitrogen fertilizer is Ksh. 4,000 per tonne and the total cost of applying phosphorus fertilizer in Ksh. 3000 per tonne,
* Helicopter flying limited to 9 hours, it takes 2 hours to apply a tonne of nitrogen fertiliser and 3 hours to apply a tonne of phosphorus fertiliser,
* Total supply of 2.25 tonnes of nitrogen available and no limit of phosphorus fertiliser.

1. Define the objective function for this problem (2 marks)
2. State the boundary conditions for this objective function (2 marks)
3. What is the combination of nitrogen and phosphorus in this case that would maximises the NPV (Subject to resource limitations?) (7 marks)
4. List the 4 steps used to find optimal solution of a linear programming problem using graphical analysis. (4 marks)
5. (i) In forest regulation, both area and volume can be used to estimate yield. State the problems associated with each of these approaches in yield estimation. (4 marks)

(ii) State any five types of forest rotations (5 marks)

(iii) What factors would be considered in choosing the type and length of rotation? (6 marks)

1. (i) State and explain the purpose and basic functions of forest information systems? (6 marks)

(ii) Discuss five types of records used in forest management     (5marks)

(iii) Describe the measures you would put in place as a forest manager to manage and control forest fires (4 marks)

1. (i) What is a forest resource management plan? (2 marks)

(ii) Describe the procedure for developing a forest resource management plan (13 marks)

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