

MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS**

**2016/2017**

**SCHOOL OF BUSINESS AND ECONOMICS**

**BACHELOR OF BUSINESS MANAGEMENT**

**COURSE CODE: BBM 355**

**COURSE TITLE:** **OPERATIONS RESEARCH 1**

**DATE: SEPTEMBER 2017 TIME: 2 HOURS**

**INSTRUCTIONS:**

Attempt question one in section A & any other two Questions in section B: Clear Examples, Calculations and Explanations Are Awarded

Do not write on the exam question paper.

**QUESTION ONE**

1. Give any two assumptions you would make in a queue. **(4 MARKS)**
2. Consider the linear problem.

Maximize 

Subject to





**Required**

Using simplex technique solve and interpret thisproblem. **(8 MARKS)**

1. Define the term operations research in a simple way to a layman. **(2 MARKS)**
2. Is OR relevant to you as a student of business and if so how will you use in a real organization. **(3 MARKS)**
3. Explain how you would apply linear programming in real business. **(6 MARKS)**
4. Differentiate total float from free float. **(2 MARKS)**

**SECTION TWO: ATTEMPT ANY THREE QUESTIONS IN THIS SECTIONS**

**QUESTION TWO**

**(a)** Explain the steps in minimum cost method as used to get the initial solution for a transportation problem. **(5 MARKS)**

**(b)** The Tan company has four plants and four warehouse in its distribution systems. The capacities of plants and the requirements of the warehouses are summarized as follows as well as the cost.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Plant** | | | | | | **CAPACITY** |
| **warehouse** | **1** | **2** | | **3** | | **4** | |  |
| **A** | **9** |  | **8** |  | **12** |  | **10** | **36** |
|  |
|  |
|  |  |
| **B** | **10** |  | **10** |  | **12** |  | **14** | **44** |
|  |  |
|  |  |
| **C** | **8** |  | **9** |  | **11** |  | **11** | **12** |
|  |  |
|  |  |
|  | **10** | **10** | | **11** | | **12** | | **20** |
|  |  | |  | |  | |  |
| **REQUIREMENTS** | **12** | **30** | | **60** | | **10** | |

**Required**

1. Obtain the optimal solution using MODI **(10 MARKS)**

**QUESTION THREE**

* 1. What are the steps in minimization assignment problem using Hungarian approach? **(5 marks)**
  2. A company employs services engineers based at various locations throughout the country to service and repair their equipment installed in customer’s premises. Four requests for services have been received and the company finds that four engineers are available. The distances each of the engineers is from the various customers, is given in the following table and the company wishes to assign engineers to customers to minimize the total distances to be travelled.

Customers

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | W | X | Y | Z |
| Alf | 25 | 18 | 23 | 14 |
| Bill | 38 | 15 | 53 | 23 |
| Charlie | 15 | 17 | 41 | 30 |
| Dave | 26 | 28 | 36 | 29 |

* 1. **Required:**

1. The five customers that the engineers should be assigned to in order to minimize the total distance. (**5 marks)**

ii) Calculate the total mileage of the final assignment. **(5 marks)**

**QUESTION FOUR**

(a) Give any two advantages and disadvantages of using simulation. **(4 MARKS)**

(b) What are the objectives of inventory control **(6 MARKS)**

(c) Develop a five day simulation using a case of your own. **(5 MARKS)**

**QUESTION FIVE**

1. What is an independent project?  **(2 MARKS)**
2. Differentiate normal duration from normal cost as used in project management **(3 MARKS)**
3. Preface Retailers is a high-technology retailer and mail order business. In order to improve its process the company decides to install a new microcomputer system to manage its entire operation (i.e. payroll, accounts, and inventory).Terminals for each of its many stores will be networked for fast, dependable service. The specific activities that Preface will need to accomplish before the system is up and running are listed below. The table also includes the necessary increased staffing to undertake the project.

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Preceding**  **Activities** | **Duration**  **(Days)** | **Increased**  **Staff** |
| A. Build insulated enclosure  B. Decide on computer system  C. Electrical wiring of room  D. Order and collect computer  E. Install air conditioning  F. Install computer  G. Staff testing  H. Install software  I. Staff training | -  -  A  B  A  D, E  B  C, F  G, H | 4  1  3  2  4  2  5  2  3 | 1  3  2  1  2  2  1  1  1 |

**Required:**

1. Draw the network diagram and find the critical path **(10 MARKS)**