

**NATIONAL OPEN UNVERSITY OF NIGERIA**

**University Village, Plot 91, Cadastral Zone, Nnamdi Azikiwe Express Way, Jabi, Abuja**

**FACULTY OF SCIENCES**

JULY 2017 EXAMINATION

**Course Title:** CIT425: Operations Research **Credit Unit:** 3

**Instruction:** Answer question one and three others **Time:** 3hrs

**Question One**

**1a).** Explain the term Operations Research and also describe the role, and limitations.

**10marks**

**1b**). Enumerate the types of models used in Operations Research. **2marks**

**1c).** Write short note on the following programs :

1. linear programs -**1mark**
2. quadratic program -**1mark**
3. integer program *-***1mark**

**1d)** The sales manager of Turnover Limited maintains he could increase the sales turnover (in units) of any of the company’s product by 50 per cent if he was authorized to give a 10% price discount and place appropriate additional advertising matter. The Board wish to know the maximum additional advertising expense they can incur in respect of any given product without the manager’s proposal resulting in a smaller profit. -**10marks.**

**Question Two**

2a)**.** In a Simplex method what do change of Basis means? **-3marks**

2b). Mention and explain any five applications of Linear Programming to Business.

**5marks.**

2c)**.** Maximise Z = 2*x1 + 4x2 – 3x3*

Subject to the constraints.

x*1 + x2 + x3* > 8

x*1 - x2* > 1

*3*x*1 +4 x2 + x3* > 40 **-7marks**

**Question Three**

3a).What are the constraints in the formulation of Linear Programming Models? **-3marks**

3b). Hallbottle manufactures two types of settee; half-upholstered and full-upholstered.

The contribution per unit to profit is N80 for half-upholstered and N90 for full-upholstered. The amount of materials needed per product and maximum available materials are given below:

|  |  |  |  |
| --- | --- | --- | --- |
| Product | Unit of Material | | |
| Wood | Foam | cover |
| Half-upholstered | 2 | 2 | 5 |
| Full-upholstered | 1 | 4 | 5 |
| Maximum available | 12 | 24 | 35 |

Formulate the linear programming model for the above problem **-12marks**

**Question Four**

4a). Under Cutting-Plane Algorithm Fractional algorithm and mixed algorithm are applied to the two problems respectively, what are the five steps involved in finding the solutions? -**5marks**

4b). Write short note on the following assumptions of Linear Programming

1. Certainty -**2marks**
2. Proportionality **-2marks**
3. Additivity **-2marks**
4. Divisibility **-2marks**
5. Non-negativity **-2marks**

**Question Five**

5a). Explain the important terms in Dynamic programming that you have leant**. -5marks**

5b). State and explain the steps that are involved in the formulation and solution of Dynamic programming. **- 5marks**

5c). State any five characteristics general transportation tableau **. -5marks**

**Question Six**

6a). Explain the concept of Transportation problem in Operation Research **-3marks**

6b). What are the general form of a transportation problem for '*m*' sources and '*n*' destination

-**6marks**

6c). Mention three methods used to find the initial feasible solution -**6marks**