

SOUTHWESTERN UNIVERSITY NIGERIA

- KM 20, SAGAMU-BENIN EXPRESSWAY, OKUN OWA, IJEBU-ODE, OGUN STATE.
 FACULTY OF PURE & APPLIED SCIENCES
 DEPARTMENT OF COMPUTER SCIENCE
 HND TO BSC CONVERSION PROGRAMME
 2018/2019 FIRST SEMESTER EXAMINATION
1. (a) Highlight the approaches of Operation Research
 (b) Suppose an industry is manufacturing two types of products P_1 and P_2 . The profits per kg of the two products are Rs. 30 and Rs. 40 respectively. These two products require processing in three types of machine. The following table shows the available machine hours per day and time required on each machine to produce one kg of P_1 and P_2

COURSE CODE: CSC 311	COURSE TITLE: Computational Science & Numerical Methods	Profit/kg P_1 Rs.30	Profit/kg P_2 Rs.40	Total available hours/day
Machine		1	3	600
Machine		2	3	800
Machine		3	5	1100

INSTRUCTION: Answer question 1 and any other two questions. **TIME:** 2hrs

1. (a) Formulate the problem in the form of linear programming model.
 (b) Suppose an industry is manufacturing two types of products P_1 and P_2 . The profits per kg of the two products are Rs. 30 and Rs. 40 respectively. These two products require processing in three types of machine. The following table shows the available machine hours per day and time required on each machine to produce one kg of P_1 and P_2

(a) Obtain the complete solution of the following system of equations.

Profit/kg P_1 Rs.30	Profit/kg P_2 Rs.40	Total available hours/day
$10x_1 + x_2 + 2x_3 = 6$		
$2x_1 + x_2 + 10x_3 + x_4 = 11$		
$3x_2 + x_3 + 3x_4 = 15$		
$3x_3 + 5x_4 = 25$		

using Cramers rule

- (b) State the major short-coming of Cramers rule in practical applications
 (i) Formulate the problem in the form of linear programming model.
3. (a) Explain what is meant by the LPP.
 (ii) Using graphical or simple x method, obtain an optimal solution of the given LPP.

2. (a) Obtain the complete solution of the following system of equation.
 subject to $AX(\geq) (\leq) B$ to be in a canonical form
- | | |
|----------------------------------|----------|
| $10x_1 + x_2 + 2x_3 = 6$ | |
| $11x_2 + x_3 + 3x_4 = 25$ | solution |
| $2x_1 + x_2 + 10x_3 + x_4 = -11$ | |
| $3x_2 + x_3 + 3x_4 = 15$ | region |
- using Cramers rule
 (iii) optimal solution

- (b) State the major short-coming of Cramers rule in practical applications
 (c) Apply Newton-Rahsons method to bound $f(x) = x^2 + e^{1/2x}$ using an initial guess x_0
3. (a) Explain what is meant by the LPP of an accuracy of 10^{-6} is obtained.
 $Z = \sum_{i=1}^n C_i X_i$

4. (a) Given a system of $n \times n$ linear equation of the form $AX = B$, write the system subject to $AX(\geq) (\leq) B$ to be in a canonical expanded form
 (b) Explain and state the methods of solving such systems of equations
 (i) feasible solution
 (b) Apply Gaussian elimination method to solve $x + 4y + z = 5$; $x + y + 6z = 12$; $3x + y + z = 4$
 (ii) z feasible region
 (iii) optimal solution

