(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

SPECIAL /SUPPLIMENTARY EXAMINATIONS
YEAR FOUR SEMESTER ONE

FOR THE DEGREE OF
COMPUTER SCIENCE

COURSE CODE : CSC 412

COURSE TITLE : OPERATIONS RESEARCH

DATE: 15/11/22 **TIME: 11.00 A.M – 01.00 P.M**

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION FOUR [20 MARKS]

a) A foreman had four fitters and has been asked to deal with fire jobs. The times for each job are estimated as follows:

	A	B	C	D
1	6	22	12	18
2	12	18	16	14
3	20	15	18	10
4	12	20	15	17

Allocate the men to the jobs so as to minimize the total times taken and identify the job which will not be dealt with (use Hungarian method). (10 marks)

b) Dorian makes luxury cars and jeeps for high-income men and women. It wishes to advertise with 1 minute spots in comedy shows and football games. Each comedy spot costs \$50K and is seen by 7M high-income women and 2M high-income men. Each football spot costs \$100K and is seen by 2M high-income women and 12M high-income men. How can Dorian reach 28M high-income women and 24M high-income men at the least cost?

i) Develop and LP model. (4 marks)

ii) Hence use graphical method to obtain the optimum solution to the linear programming problem. (6 marks)

QUESTION FIVE [20 MARKS]

a) Solve the following problem (10 marks)

Max $Z = 5x_1 + 12x_2 + 4x_3$

Subject to

$$x_1 + 2x_2 + x_3 \leq 5$$

$$2x_1 - x_2 + 3x_3 = 2$$

$$x_1, x_2, x_3 \geq 0$$

b) Discuss the effect of changing the requirement vector from $\binom{5}{2}$ to $\binom{3}{9}$ on the optimum solution. (6 marks)

c) Discuss the effect of changing the requirement vector from $\binom{5}{2}$ to $\binom{7}{2}$ on the optimum solution. (4marks)