THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

AUGUST - DECEMBER 2018 TRIMESTER

FACULTY OF COMMERCE

DEPARTMENT OF ACCOUNTING AND FINANCE

ODEL PROGRAMME

CMS 321: ANALYTICAL DECISION MAKING

Date: DECEMBER 2018	Duration: 2 Hours
INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions	

Q1.   a)   Giapetto's wooden soldiers and trains. Each soldier sells for $27, uses $10 of raw materials and takes $14 of labor & overhead costs. Each train sells for $21, uses $9 of raw materials, and takes $10 of overhead costs. Each soldier needs 2 hours finishing and 1 hour carpentry; each train needs 1 hour finishing and 1 hour carpentry. Raw materials are unlimited, but only 100 hours of finishing and 80 hours of carpentry are available each week. Demand for trains is unlimited; but at most 40 soldiers can be sold each week. How many of each toy should be made each week to maximize profits? **(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?

(10Marks)

c)   Consider the linear Programming problem and then solve it using Simplex method.

Maximize Z = $5x_1 + 3x_2$
Subject to $x_1 + x_2 \leq 2$
                 $5x_1 + 2x_2 \leq 10$

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$$3x_1 + 8x_2 \leq 12$$
$$x_1, x_2, \geq 0 \qquad \textbf{(10 marks)}$$

Q2. UKZN Maintenance Department employs five joiners. Each man has different abilities and skills and takes different amounts of time to do each job. At present, there are five jobs to be allocated. The time taken for each job by each person is given below:

Time per job (hours)

		Job 1	Job 2	Job 3	Job 4	Job 5
	M1	25	16	15	14	13
	M2	25	17	18	23	15
EMPLOYEE	M3	30	15	20	19	14
	M4	27	20	22	25	12
	M5	29	19	17	32	10

The jobs have to be assigned one job to one man. How this should be done in order to minimize the total man-time needed to finish all of the jobs? Use the Hungarian method to solve the problem. **(20 marks)**

Q3. Turkish national swimming team coach is putting together a relay team for the 400 meter relay. Each swimmer must swim 100 meters of breaststroke, backstroke, butterfly, or free style. The coach believes that each swimmer will attain the times (seconds) given in the Table below. To minimize the team's time for the race, assign each swimmer for a stroke.

	Free	Breast	Fly	Back
Derya	54	54	51	53
Murat	51	57	52	52
Deniz	50	53	54	56
Ceyhun	56	54	55	53

(20 marks)

Q4. A shoe company forecasts the following demands during the next three months: 200, 260, 240. It costs $7 to produce a pair of shoes with regular time labor (RT) and $11 with overtime labor (OT). During each month regular production is limited to 200 pairs of shoes, and overtime production is limited to 100 pairs. It costs $1 per month to hold a pair of shoes in inventory. Formulate a balanced transportation problem to minimize the total cost of meeting the next three months of demand on time (Do not try to solve it!). **(20 marks)**

END

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