JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS AND ECONOMICS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION

4TH YEAR1st SEMESTER 2022/2023 ACADEMIC YEAR

MAIN CAMPUS (REQULAR)

COURSE CODE: **BAB 1403**

COURSE TITLE: **QUANTITATIVE METHODS IN BUSINESS 11**

EXAM VENUE: STREAM:

DATE: 05/12/2022 **EXAM SESSION: 9.00-11.00AM**

TIME: 2 HOURS

Instructions:

1. **Answer Question ONE (COMPULSORY) and ANY other 2 questions**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE

a) State four assumptions of transportation problem (4marks)

b) State four applications of Simulation in business (4marks)

c) The following table shows advertising expenses and the corresponding sales in a company

Advertising Expenses ("000") ksh.	63	72	60	42	49	47	36	42	56
Sales (millions) ksh.	149	160	155	140	145	128	118	125	147

Determine the regression equation in the form y = a + bx and use it to determine

i. Sales when advertising expenses is ksh. 54,000

ii. Advertising expenses when sales is 135 million (10marks)

d) Define the following terms as used in queuing theory

(i) Queue discipline (1mark)

(ii) Dummy destination (1mark)

(iii) Slack variables (1mark)

(iv) Service Mechanism in queuing theory (1mk)

(v) Jockeying (1mark)

(vi) Reneging (1mark)

e) Outline the limitations of simulation (6marks)

QUESTION TWO

a) A shop manager has four employees and four tasks to be performed. His estimate of the time in hours that each employee would take to perform each task is given as follows:

Tasks	**Employees**			
	John	**Hassan**	**Mary**	**Alice**
I	16	52	54	22
II	26	56	18	52
III	76	38	36	30
IV	38	52	48	20

I) Determine how the tasks, should be assigned in order to minimize the total man hours. (8marks)

II) Calculate the minimum total time taken (2marks)

(b) XYZ has a policy of ordering stock when level falls to 15units.The quantity ordered from the supplier is always 30 units, the stock at the first week is 20 units.The stock holding cost is sh. 10 per week/per unit.The cost of placing one order is sh. 25.The stock out cost are sh. 100 per unit.The usage (demand) and lead time (time taken by supplier to deliver stock) is uncertain as shown below.

N/B. Ordering is done the following week upon delivery of the shortages.

Demand	Probability	Lead time	Probability
0	0.02	1	0.23
1	0.08	2	0.45
2	0.02	3	0.17
3	0.34	4	0.09
4	0.18	5	0.06
5	0.09		1.0
6	0.07		
	1.0		

Required

Use the following random numbers

67,50,51,90,58,06,70,40,90,25,89,10.60,05

Use 14 trials to find the cost (10marks)

QUESTION THREE

(a) The table below shows the number of cars stocked by car dealers A, B and C which are to be distributed to the various customers D, E, F and G with their specific demand and cost of distribution per unit shown.

	D	E	F	G	Available
A	34	13	17	14	250
B	16	8	14	10	690
C	21	14	13	4	400
Demand	200	225	475	250	

i) Using the VAM method, determine the basic solution to the transportation problem. (8marks)

ii) Calculate the minimum total cost of transportation (2marks)

(b) (i) Explain the meaning of simulation and state its usefulness in business decision making (5marks)

(ii) Define the following as used in simulation

i. Static simulation

ii. Dynamic simulation

iii. Determinants

iv. Stochastic simulation

v. Output variables (5marks)

QUESTION FOUR

(a) A certain type of machines breakdown at an average rate of 5 per hour. The breakdown are in accordance of Poissonprocess. Cost of idle machine hour comes to Rs. 15 per hour. Two repairmen A and B have been interviewed. A charges Rs. 8 per hour and he services breakdown machines at a rate of 7 per hour whereas B charges Rs. 10 per hour and he services the said machines at an average of 9 per hour. Which repairman's services should be used and why? (Assume the work shift is of 8 hours) (10marks)

(b) Solve by simplex method the following (10 marks)

Maximize $Z = 7X_1 + 5X_2$

Subject to:

(Constraint 1) $x_1 + 2x_2 \geq 6$

(Constraint 2) $4x_1 + 3x_2 \leq 12$

(Constraint 3) $x_1, x_2 \geq 0$

QUESTION FIVE

a) A certain type of machines breakdown at an average rate of 5 per hour. The breakdown are in accordance of Poisson process. Cost of idle machine hour comes to Rs. 15 per hour. Two repairmen A and B have been interviewed. A charges Rs. 8 per hour and he services breakdown machines at a rate of 7 per hour whereas B charges Rs. 10 per hour and he services the said machines at an average of 9 per hour. Which repairman's services should be used and why? (Assume the work shift is of 8 hours) (6marks)

b) Differentiate between positive and negative correlation giving an example in each case (4marks)

a) The following data have been collected regarding sales and advertising expenditure

Sales (£'m)	Advertising expenditure (£'000)
8.5	210
9.2	250
7.9	290
8.6	330
9.4	370
10.1	410

Calculate the correlation coefficient for the above data and interpret your result (10marks)