MASINDEMULIROUNIVERSITY OF SCIENCE AND TECHNOLOGY
KISUMU CITY CAMPUS

EXAMINATIONS
2015/2016 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATIONS

FOR DEGREE
IN
BACHELOR OF COMMERCE

COURSE CODE: **BCB 206**

COURSE TITLE: **MANAGEMENT DECISION MODELS**

DATE: SEPTEMBER 2016   **TIME: 2 HOURS**

INSTRUCTIONS TO CANDIDATES

Answer question **One** and any other **Two** questions

1 (a) Define Linear Programming and state its assumptions (5 marks).

(b) State the advantages of Linear Programming (5 marks).

(c) A firm produces two products X and Y with a contribution of $8 and $10 per unit respectively. Production data per unit is shown below:

	Labor hours	Material A	Material B
X	3	4	6
Y	5	2	8
Total Available	500	350	800

Required:

(a) Formulate a Linear Programming Model in the standardized manner (5 marks).
(b) Use Graphical Method to solve the model, hence find the number of product X and product Y that would optimize contribution, hence find the optimum contribution (10 marks).
(c) Calculate the shadow prices of the binding constraints and give your comments (5 marks).

2. The table below shows a transportation problem with cost coefficients.

FROM TO	1	2	3	Supply
A	67	42	51	250
B	61	24	39	400
C	29	47	60	300
D	43	31	42	200
Demand	400	150	600	1150

Required:

(a) Find an initial solution using the least cost method (10 marks).
(b) Find the optimal solution using the stepping stone method (10 marks).

3.   A project has the following activities and characteristics:

Activity	Preceding Activity	Time Estimates in Weeks		
		Optimistic	Most Likely	Pessimistic
A	None	4	7	16
B	None	1	5	15
C	A	6	12	30
D	A	2	5	8
E	C	5	11	17
F	D	3	6	15
G	B	3	9	27
H	E,F	1	4	7
I	G	4	19	28
J	I,H	3	4	5

Required:

(a) Draw the PERT Network diagram and identify the Critical Path (10 marks).

(b) Determine the mean project completion time (5 marks).

(c) What is the probability that the project is completed in 36 weeks (5 marks).

4. (a) From the table below, use the coefficient of optimism (C) to determine the best course of action given that the degree of optimism, $\beta = 0.75$ (15 marks).

Course of Action	State of Nature S1	S2	S3	S4
A1	12	34	19	20
A2	-24	17	15	57
A3	10	35	38	23
A4	15	0	45	47
A5	25	-27	52	33

(b) Given the payoff matrix below for Firm A and Firm B's strategies.

Firm A	Firm B B1	B2	B3	B4
A1	1	-3	2	3
A2	5	6	4	5
A3	-2	-1	0	1

(i) Determine the best strategy for firm A, giving appropriate reasons (3 marks).

(ii) State the saddle point (1 mark).

(iii) What kind of game is this? (1 mark).

5. (a) What do you understand by queuing analysis? (2 marks).

(b) Describe at least three structures of the queuing system, stating clearly how they are being applied in specific institutions (6 marks).

(c) Describe the unusual customer behavior in queues (6 marks).

(d) Customers arrive randomly at a department store at an average rate of 3.4 per minute. Assuming the customer arrivals form the Poisson distribution, calculate the probability that:

(i) No customer arrives in any given minute (2 marks).

(ii) Exactly one customer arrives in any given minute (2 marks).

(iii) Two or more customers arrive in any given minute (2 marks).