Course Code: BUS 800   **Credit Unit: 2**
Course Title: Quantitative Analysis
Instructions: 1. Indicate your Matriculation Number clearly
2. Attempt Question 1 and any other two (2) questions
3. Question 1 is compulsory and carries 30 marks while the other 2 questions carry 20marks each
4. Present all your points in coherent and orderly manner
Time Allowed: 2 Hours

(1) A farmer is considering his activity in the next farming season. He has a choice of three crops to select from for the next planting season – Groundnuts, Maize, and Wheat. Whatever is his choice of crop; there are four weather conditions that could prevail: heaving rain, moderate rain, light rain, and no rain. Below is the table presenting the activity in a summary?

Alternative corps	Weather conditions			
	Heavy rain S_1	Moderator rain S_2	Light rain S_3	No rain S_4
Groundnut D_1	750, 000	1, 000, 000	450, 000	-1, 000
Mazie D_2	1, 200, 000	1, 500, 000	600, 000	2, 000
Wheats D_3	1, 150, 000	1, 300, 000	800, 000	-200, 000

The farmer has contacted you, an expert in OR to help him decide on what to do? Construct a payoff matrix for the above situation, analyse completely and advise the farmer on the course of action to adopt. Assume $\alpha = 0.6$ 30mark

(2a) From Bayes theorem, if the probability of meeting a business contract date is 0.8, the probability of good weather is 0.5 and the probability of meeting the date given good weather is 0.9, we can calculate the probability that there was good weather given that the contract date was met.

(2b) Identify the four basic laws of probability?

(2c) An ice-cream salesman divides his days into _Sunny _Medium'or _Cold'. He estimates that the probability of a sunny day is 0.2 and that 30% of his days are cold. He has also calculated that his average revenue on the three types of days is N220, N130, and N40 respectively. If his average total cost per day is N80, calculate his expected profit per day.

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(3) Identify the four conditions under which decisions can be made?   20mark

(4a) Identify and briefly explain any five industrial applications of linear programming?

(4b), A firm manufactures three products A, B and C. Time to manufacture product P from Machines A, B and C are 6, 5 and 2 hours respectively. Also the time to manufacture product Q from Machines A, B, and C are 4, 7 and 3 hours respectively. The product in kg available for Products P and Q are 5, 000 and 6,000. The profit earned per unit for A, B, and C is #90, #40 and #30 respectively. Formulate the problem as a linear programming problem.

20mark

5) Assuming eight jobs are waiting to be processed. The processing time and due dates for the jobs are given below: Determine the sequence processing according to (a) FCFS and (b) SPT in the light of the following criteria:

    Average flow time,
    Average number of jobs in the system,
    Average job lateness,
    Utilization of the workers

JOB	A	B	C	D	E	F	G	H
PROCESSING TIME	4	10	6	12	7	14	9	18
DUE DATE (DAYS)	9	18	6	19	17	20	24	28

20mark