PENINSULA COLLEGE GEORGETOWN DK266-03(P)

UNIVERSITY OF PLYMOUTH

FINAL EXAMINATION

Semester	:	**JANUARY 2024 SEMESTER**
Programme Name	:	**BA (HONOURS) BUSINESS 3+0 IN COLLABORATION WITH UNIVERSITY OF PLYMOUTH**
Course Code & Name	:	**MAL2030 MANAGEMENT DECISION MAKING**
Duration	:	**3 HOURS**

INSTRUCTIONS TO CANDIDATES:

1. Please read the instructions given in the question paper **CAREFULLY.**
2. The question paper consists of **FOUR (4)** questions.
3. Answer **ALL** questions in the question paper.
4. Answers to the questions are to be written into the examination booklet.
5. Electronic dictionaries, lecture notes, files or any unauthorised materials except writing equipment are strictly prohibited.

This question paper must be submitted along with all used and/or unused rough papers and/ or graph papers (if any). Candidates are **NOT ALLOWED** to take any examination paper(s) used or unused out of the examination hall.

WARNING:

The Examination Board of Peninsula College Georgetown regards cheating as a very serious offence and will not hesitate to mete out the appropriate punitive actions according to the severity of the offence committed, and in accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from Peninsula College Georgetown.

(*This booklet contains 5 printed pages including this page*)

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ALLOWED TO DO SO

Answer any **TWO (2)** questions on the separate sheet provided. **[100 marks]**

1. a) Describe the roles of operations research and business analytics in management science.

(10 marks)

b) Discuss the differences between quantitative and qualitative approach to decision making.

(12 marks)

c) Gee Solvents produces two raw materials called product Alpha (A) and product Beta (B) that are sold to toothpastes manufacturers. The management of Gee Solvents specified that the combined total production for products A and B must be at least 600 gallons. For next month, the production time is limited to 900 hours, whereby A requires 2 hours processing time and B requires 1 hour processing time.

Additionally, Gee Solvents received a special order where 300 gallons of product A must be fulfilled.

The production costs for products A and B are RM4 per gallons and RM6 per gallons respectively.

The linear programming model is as follows:

$$\begin{aligned} \text{Min} \quad & 4A + 6B \\ \text{s.t.} \quad & \\ & 1A \geq 300 \\ & 1A + 1B \geq 600 \\ & 2A + 1B \leq 900 \\ & A, B \geq 0 \end{aligned}$$

Required:

i) Draw a graphical solution based on the above linear programming model and label all parts of the graph including the feasible region.

(12 marks)

ii) Determine the coordinates of each extreme point and the corresponding cost. Identify which extreme point generates the lowest cost.

(8 marks)

iii) Supposed that now the cost per gallons for products A and B are RM6 per unit and RM4 per unit accordingly, recalculate the cost for each extreme point. Also, identify which extreme point generates the lowest cost based on the new cost per gallon.

(8 marks)
[Total: 50 marks]

2. a) Huang Investment has a new client who requested for an investment portfolio. The new client would like to restrict the portfolio to a mix of two different shares.

The client wants to invest RM100,000 and established the following two investment goals.

Share	Price/share (RM)	Estimated annual return (%)
ANX Electronics	100	10
Riz Palm Oil	200	20

Priority Level 1 Goal
Goal 1: Obtain an annual return of at least 16%

Priority Level 2 Goal
Goal 2: Limit the investment in Riz Palm Oil to no more than 60% of the total investment.

Required

i) Formulate a goal programming model for the Huang Investment problem (10 marks)

ii) Use the graphical goal programming procedure to obtain a solution. (12 marks)

b) You are going for a holiday and you have shortlisted three apartment hotels. The criteria and weights are shown below for the three accommodations.

Criteria	Weight	Hotel Alpha	Hotel Beta	Hotel Gamma
Cost	5	7	5	6
Location	4	4	9	6
Exterior Design	2	4	6	6
Interior Design	3	6	4	4
Parking	3	7	4	8
Traffic congestion	3	2	5	6
View	1	4	9	5
Kitchen	4	8	6	8
Facilities	3	7	4	6

Required:
i) Compute the score for each criterion and the total score for each accommodation. (15 marks)

ii) Based on (i) above, state your preferred accommodation. (1 mark)

c) Discuss the usage of big data in organisations. (12 marks)
[Total: 50 marks]

3. a) Ajax Chemical is considering four decision alternatives and the four states of nature are shown in the profit payoff table below:

Decision alternatives	State of nature			
	s_1	s_2	s_3	s_4
d_1	15	10	11	6
d_2	13	11	9	8
d_3	10	11	11	12
d_4	9	11	12	14

Required:

i) State the recommended decision using the optimistic, conservative, and minimax regret approaches. You are also required to construct a regret table.

(14 marks)

ii) Assume that the payoff table above refers to cost rather than profit payoffs. State the recommended decision using the optimistic, conservative, and minimax regret approaches. You are also required to construct a regret table.

(14 marks)

b) Acme Plantation is considering three different fruits to expand its plantation, which are mango, durian, or jackfruit. The cost of operation depends on future demand. The annual cost of each option (in thousand ringgit) depends on demand as follows:

Options	Demand		
	High	Medium	Low
Mango	800	770	700
Durian	1,000	700	400
Jackfruit	900	750	600

The demand probabilities are 0.3 (high), 0.6 (medium), and 0.1 (low). Acme Plantation wants to know which decision alternative will minimise their cost of operation.

i) Calculate the expected cost associated with each decision alternative and state your recommendation.

(7 marks)

ii) Based on your decision in (b)(i) above, construct a risk profile.

(5 marks)

c) Describe each personality of negotiators who are inclined to each of the five modes of the Thomas-Kilman conflict model.

(10 marks)
[Total: 50 marks]

4. a) The following time series data has been presented to you.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul
Value	52	26	36	28	44	60	34

Required:

i) Define time series. (2 marks)

ii) Construct a time series plot. (5 marks)

iii) Develop a three-month moving average for this time series. Compute a mean squared error and forecast for the month of August.
(9 marks)

iv) Use $\alpha = 0.3$ to compute the exponential smoothing values for the time series. Compute the mean squared error and a forecast for the month of August.
(12 marks)

v) Compare the three-month moving average forecast with the exponential smoothing forecast using $\alpha = 0.3$. Which appears to provide the better forecast based on mean squared error?
(2 marks)

b) Discuss with examples the **FIVE (5)** types of quality attributes based on the Kano Model.
(20 marks)
[Total: 50 marks]

- END OF QUESTIONS -