



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014**

COURSE NAME : MANAGEMENT SCIENCE II
COURSE CODE : BPB 20603
PROGRAMME : 2 BPA
EXAMINATION DATE : JUNE 2014
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

- Q1** Southland Corporation's decision to produce a new line of recreational product resulted in the need to construct either the small plant or a large plant. The best selection of plant size depends on how the market place reacts to the new product line. To conduct an analysis, marketing management has decided to view the possible long-run demand as either low, medium, or high. Table **Q1** shows the projected profit in millions of Ringgit Malaysia:

Table Q1

Plant Size	Long-Run Demand		
	Low	Medium	High
Small	150	200	200
Large	50	200	500

- (a) Determine the decision to be made, and the chance event for Southland's problem. (3 marks)
- (b) Construct an influence diagram. (4 marks)
- (c) Construct a decision tree (4 marks)
- (d) Recommend decision based on the use of;
- (i) Optimistic approach
 - (ii) Conservative approach
 - (iii) Minimax regret approach
- (9 marks)

- Q2** Pittsburgh Development Corporation (PDC) has purchased land for a luxury, riverfront condominium complex. The company must first decide whether to undertake the market research study. If the market research study is conducted, the outcome will either be favorable (F) or unfavorable (U). Assume there are only two decision alternatives d_1 and d_2 and two states of nature s_1 and s_2 . Table **Q2** shows the profit as follows:

Table Q2

Decision Alternative	State of Nature	
	s_1	s_2
d_1	100	300
d_2	400	200

- (a) Construct the decision tree. (5 marks)
- (b) Determine the optimal decision strategy using the following probabilities,.

$$\begin{array}{llll}
 P(F) = 0.56 & P(s_1 | F) = 0.57 & P(s_1 | U) = 0.18 & P(s_1) = 0.40 \\
 P(U) = 0.44 & P(s_2 | F) = 0.43 & P(s_2 | U) = 0.82 & P(s_2) = 0.60
 \end{array}$$

(15 marks)

- Q3** Data collected from selected major metropolitan areas in the eastern United States show that 2% of individuals living within the city limits move to the suburbs during a one-year period, while 1% of individuals living in the suburbs move to the city during a one year period. Answer the following questions assuming that this process is modeled by a Markov process with two states, city and suburbs.

- (a) Tabulate the matrix of transition probabilities. (8 marks)
- (b) Compute the steady-state probabilities. (10 marks)
- (c) In a particular metropolitan area, 40% of the population lives in the city, and 60% of the population lives in the suburbs.

Analyse the population changes with the steady-state probabilities calculated in **Q3(b)**, for this metropolitan area.

(2 marks)

Q4 (a) Define Spanning Tree and Minimal Spanning Tree. (4 marks)

(b) The State of Ohio recently purchased land for a new state park, and park planners identified the ideal locations for the lodge, cabins, picnic groves, boat dock, and scenic points of interest. These locations are represented by the nodes of the following network shown in Figure Q4. The arcs of the network represent possible road connections in the park. The state park designers want to minimize the total road miles that must be constructed in the park and still permit access to all facilities (nodes).

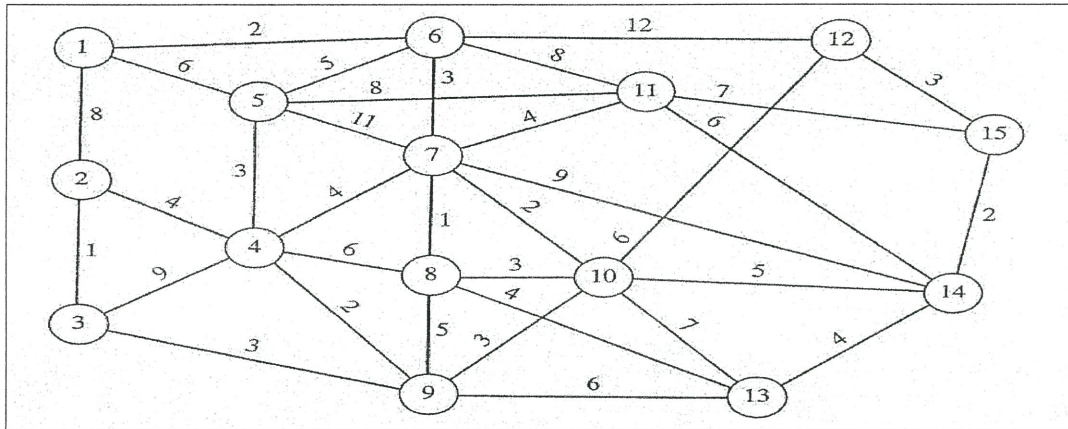


Figure Q4

Propose the best road connections that should be constructed. (16 marks)

Q5 A charter pilot has additional capacity for 2000 kilogram (kg) of cargo on a flight from Dallas to Seattle. A transport company has four types of cargo in Dallas to be delivered to Seattle. The number of units of each cargo type, the weight per unit, and the delivery fee per unit are shown in **Table Q5**.

Table Q5

Cargo Type	Units Available	Weight per Unit (100 kg)	Delivery Fee (RM)
1	2	8	22
2	2	5	12
3	4	3	7
4	3	2	3

Determine the number of units for each cargo type using Dynamic Programming. (20 marks)

-END OF QUESTION-