BINDURA UNIVERSITY OF SCIENCE EDUCATION

<u>EXECUTIVE MASTERS IN BUSINESS LEADERSHIP</u>   EMB504

OPERATIONS MANAGEMENT

September/October 2023

Time : 3 hours

OCT 2023

Candidates should answer any FOUR questions. Each question should start on a fresh page. Marks will be allocated as indicated.

A1. (a) What is Operations Management? [4]

  (b) Discuss different performance metrics. [12]

  (c) Briefly discuss the three different types of processes. [9]

A2. The WYNDOR GLASS CO. produces high-quality glass products, including windows and glass doors. It has three plants. Aluminum frames and hardware are made in Plant 1, wood frames are made in Plant 2, and Plant 3 produces the glass and assembles the products.The time taken to produce each product per plant is as follows:

Plant	Production Time Per Batch		Available per Week
	Product		
	1	2	
1	1	0	4
2	0	2	12
3	3	2	18
Profit per batch	$3000	$5000	

  (a) Formulate the linear programming problem. [4]

  (b) Use the graphical method to determine the optimal hours allocated per product and maximum profit made. [6]

  (c) Use the simplex method to determine the optimal hours allocated per product and the maximum profit made. [9]

  (d) State the best decision for the manager. [6]

A3. (a) Briefly discuss project management. [5]

  (b) What is the meaning of the abbreviation CPM-PERT in project management. [3]

  (c) Define a critical path. [3]

  (d) A company is in the process of preparing a budget to launch a new product.The following table shows the associated activities and their durations in days.

Activity	Description	Preceeding Activities	Duration
A	Forecast volume of sales	None	10
B	Study competitive markets	None	7
C	Design item and facilities	A	5
D	Prepare production Schedule	C	3
E	Estimate cost of production	D	2
F	Set sales price	B,E	1
G	Prepare Budget	E,F	14

  (i) Construct the project network for this project. [8]

  (ii) Find the earliest start times and latest time for event and identify the critical path. [7]

A4. (a) Describe the difference between the transportation and the assignment problem operations management. [10]

(b) Perform two iterations of Vogel's approximation method to solve the following transportation problem.

Supplier	Destination					Supply
	1	2	3	4	5	
1	2	4	6	5	7	5
2	7	6	3	M	4	6
3	8	7	5	2	5	6
4	0	0	0	0	0	4
Demand	4	4	2	5	5	

[15]

A5. (a) What are the two main uses of inventory control . [2]

(b) Define the following terms:

(i) set-up cost, and [1]

(ii) holding cost. [1]

(c) Neon lights at the University of Alberta are replaced at the rate of 100 per day. Lights are ordered periodically and it cost \$100 to initiate a purchase order. The lights are kept in storage at a cost of \$0.02 per day. The lead time upon placing an order and receiving it is 12 days. Determine the optimal inventory policy for ordering neon lights. [4]

(d) Briefly discuss the meaning of decision making under uncertainty. [2]

(e) Define the following terms;

(i) minimax criterion, [2]

(ii) maximum likelihood criterion. [2]

(f) Modern forest management uses controlled fires to reduce fire hazards and to stimulate new forest growth. Management has the option to postpone or plan a burning. In a specific forest tract, if burning is postponed, a general administrative cost of \$300 is incurred. If a controlled burning is planned, there is a 50% chance that good weather will prevail and burning will be carried out at a cost of \$3200. The results of the burning may be either successful with probability 0.6 or marginal with probability 0.4. Successful execution will result in an estimated benefit of \$6000 and marginal execution will provide only \$3000 in benefits. If the weather is poor, burning will be cancelled, and the associated planning cost is \$1200 with no benefit.

(i) Develop a decision tree to determine whether burning should be planned or postponed use revenue minus costs as payoff.. [9]

(ii) Which action maximizes the expected payoff? [2]

A6. (a) Operations managers have to ensure a smooth flow of the process. Explain how you document a process flow. [12]

(b) Discuss the framework for managing operations i.e. what are the duties of operations managers. [13]

END OF EXAMINATION PAPER.