**BMT 1014 MANAGERIAL MATHEMATICS TRIMESTER 3 2014/15**

**INDIVIDUAL ASSIGNMENT**

**ANSWER ALL EIGHT QUESTIONS. Submission dateline is 11 May 2015(Monday) during lecture. Late submission will result zero mark.**

1) The weekly demand for the Boon Sin Enterprise photocopying machines is given by the demand equation

where *p* denotes the wholesale unit price in dollars and *x* denotes the quantity demanded. The weekly total cost function for manufacturing these copiers is given by

where *C(x)* denoted the total cost incurred in producing *x* units.

1. Find the revenue function and the profit function. (6 marks)

(ii) Find the marginal cost function, the marginal revenue function, the marginal profit function at *x* = 3000 units (12 marks)

(iii) Find the average cost function and marginal average cost function (5 marks)

1. Given marginal average cost function at *x* = 8000 units is 0.01, interpret the result.

( 2 marks)

2) Two factories produce three different types of kitchen appliances. The following table summarizes the production capacity, the number of each type of appliance ordered, and the daily operating costs for the factories. How many days should each factory operate to fill the orders at minimum cost? Form a linear programming problem (LP) and solve the LP graphically. Find the minimum cost.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Daily number of ordered in Factory 1 | Daily number of ordered in Factory 2 | Production capacity |
| Appliance 1 | 80 | 20 | 1,600 |
| Appliance 2 | 10 | 10 | 500 |
| Appliance 3 | 20 | 70 | 2,000 |
| Daily cost | $10,000 | $20,000 |  |

(20 marks)

3) Jim and Jenny want to have $200,000 in their son’s college fund on his eighteenth birthday, and they want to know the impact on this goal of having $10,000 invested at 9.8%, compounded quarterly, on their son’s first birthday. To advise Jim and Jenny regarding this, find:

1. The future value of $10,000 investment. (4 marks)
2. The amount of compound interest that the investment earns. (2 marks)
3. The impact this would have on their goal. (2 marks)

4) Find the first and second derivatives of (8 marks)

5) An industrial asset is being depreciated at a rate so that its book value t years from now will be dollars.

1. Find the rate of change of the book value t years from now. (4 marks)
2. How fast will the book value of the asset be changing 2 years from now? (4 marks)

6) The profit from the sales of two products is given by

dollars; where x is the number of units of product 1 sold and y is the number of product 2 sold. Selling how much of each product will maximize profit? What is the maximum profit? Show that the profit is maximum.

1. marks)

7) The productivity of a company is given by function

when *x* units of labor and *y* units of capital are used. What is the marginal productivity of labor and the marginal productivity of capital when the amounts expended on labor and capital are 1,024 and 59,049,respectively?

(10 marks)

8) Evaluate the definite integral

1. marks)

**End of Paper**