جامعة السلطان الشريف علي الإسلامية
UNIVERSITI ISLAM SULTAN SHARIF ALI
SULTAN SHARIF ALI ISLAMIC UNIVERSITY

Faculty of Islamic Economics and Finance
Semester I, 2020/2021 Academic Session

Final Examination Question Paper

Course Code : BB2304
Course Name : Business Mathematics
Course Level : Bachelor of Science in Islamic Finance & Bachelor of Business Management
Time : 3 hours

Notes:

1. Answer **ALL** questions.
2. Write **ALL** your answers in the answer booklet provided.
3. Candidates are not allowed to take the **Answer Booklet** out of the examination venue.

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

QUESTION 1 (10 Marks)

a) An annuity product guarantees to pay \$7500 each year for 12 years. The interest rate is 9 percent compounded on an annual basis? What is the present value?

b) An Annuity offers an annual income of \$5000 for eight years. The interest rate is 6.5 percent compounded annually. What is the present value of the annuity?

c) A worker has their annual appraisal and receives a bonus of \$6000. His firm offers to invest his bonus in the company and guarantees to pay him \$10000 in five years' time. He studied other investment opportunities and believes he could secure 5 percent elsewhere. Should he accept the firm's offer?

d) Suppose that is possible to invest in only one of two different projects. Project A requires an initial outlay of \$1000 and yields \$1200 in 4 years' time. Project b requires an initial outlay of \$3000 and yields \$35000 after 4 years. Which of these projects would you choose to invest when the market rate is 3% compounded annually?

e) Ayana Designer is an establishment selling handbags, according to their financial manager the revenue function of selling the handbags is $R(x)= 425x-0.9x^2$ while the cost function is $C(x)=2400+45x+0.1x^2$. Find at which production does Ayana would reach Break- Even.

QUESTION 2 (10 Marks)

Raggs, Ltd., a clothing firm, determines that in order to sell x suits, the price per suit must be $p= 150 - 0.5x$. It also determines that the total cost of producing x suits is given by $C(x)=4000 + 0.25x^2$.

a) Find the total revenue, $R(x)$

b) Find the total profit, $P(x)$

c) How many suits must the company produce and sell in order to maximize profit?

d) What is the maximum profit?

e) What price per suit must be charged in order to maximize profit?

QUESTION 3 (10 Marks)

Let $R(x)$, $C(x)$, and $P(x)$ be, respectively, the revenue, cost, and profit, in dollars, from the production and sale of x items. If $R(x) = 5x$ and $C(x) = 0.001x^2 + 1.2x + 60$, find each of the following.

a) $P(x)$

b) R(100), C(100) and P (100)

c) $R'(x)$, $C'(x)$ and $P'(x)$

d) R'(100), C'(100) and P'(100)

QUESTION 4 (9 Marks)

Suppose that the monthly cost, in dollars, of producing x chairs is $C(x) = 0.001x^3 + 0.07x^2 + 19x + 700$, and currently 25 chairs are produced monthly.

a) What is the current monthly cost?

b) What would be the additional cost of increasing production to 26 chairs monthly?

c) What is the marginal cost when $x = 25$?

QUESTION 5 (9 Marks)

Pierce Manufacturing determines that the daily revenue, in dollars, from the sale of x lawn chairs is $R(x) = 0.005x^3 + 0.01x^2 + 0.5x$. Currently, Pierce sells 70 lawn chairs daily.

a) What is the current daily revenue?

b) How much would revenue increase if 73 lawn chairs were sold each day?

c) What is the marginal revenue when 70 lawn chairs are sold daily?

QUESTION 6 (9 Marks)

Crawford Computing finds that its weekly profit, in dollars, from the production and sale of x laptop computers is $P(x) = -0.004x^3 - 0.3x^2 + 600x - 800$. Currently Crawford builds and sells 9 laptops weekly.

a) What is the current weekly profit?

b) How much profit would be lost if production and sales dropped to 8 laptop weekly?

c) What is the marginal profit when $x = 9$?

QUESTION 7 (4 Marks)

Find the maximum profit and the number of units, x, that must be produced and sold in order to yield the maximum profit. Assume that $R(x)$ and $C(x)$ are the revenue and cost, in dollars, when x units are produced: $R(x) = x^2 + 110x + 60$, $C(x) = 1.1x^2 + 10x + 80$.

QUESTION 8 (9 Marks)

A cellular phone company has the following production function for a smart phone $p(x,y) = 50x^{2/3}y^{1/3}$ where p is the number of units produced with x units of labor and y units of capital.

a) Find the number of units produced with 125 units of labor and 64 units of capital.

b) Find the marginal productivities.

c) Evaluate the marginal productivities at $x = 125$ and $y = 64$.

QUESTION 9 (9 Marks)

Riverside Appliances has the following production function for a certain product: $p(x,y) = 1800x^{0.621}y^{0.379}$ where p is the number of units produced with x units of labor and y units of capital.

a) Find the number of units produced with 2500 units of labor and 1700 units of capital.

b) Find the marginal productivities.

c) Evaluate the marginal productivities at $x = 2500$ and $y = 1700$

QUESTION 10 (9 Marks)

A firm produces two types of calculators each week, x of type A and y of type B. The weekly revenue $R(x,y) = 80x + 90y + 0.04xy - 0.05x^2 - 0.05y^2$ and cost function $C(x,y) = 8x + 6y + 20{,}000$. Find Marginal Profit if P_x (1200,1800) and P_y(1200,1800) and interpret the results

QUESTION 11 (6 Marks)

If the marginal cost of producing x units of a commodity is given by $C'(x) = 0.3x^2 + 2x$ and the fixed cost is \$2000.

a) Find the cost function C(x)
b) Find the cost of producing 20 units.

QUESTION 12 (6 Marks)

A satellite radio station is launching an aggressive advertising campaign in order to increase the number of daily listeners. The station currently has 27,000 daily listeners, and management expect the number daily listeners $S(t)$ to grow at the rate of $S'(t) = 60t^{1/2}$ listeners per day, where t is the number of days since the campaign began. How long should the campaign last if the station wants the number of daily listeners to grow to 41,000?

بالتوفيق والنجاح