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COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE (CBPLG)

NMMS 101 MATHEMATICS FOR BUSINESS I

END OF FIRST SEMESTER FINAL EXAMINATIONS

NOVEMBER 2019

LECTURER: Mr. J TENGWI

DURATION: 3 HRS

INSTRUCTIONS

Answer any ***five*** *q*uestions in Question Paper

Start each question on a new page in your answer booklet

The marks allocated to each question are shown at the end of each question.

Question One

(a) Find the point of intersection of the two lines and sketch the lines on the same axes

$4x + 3y = 11$
$2x + y = 5$ [4]

(b) Sketch the line 5y-6x=30 [3]

(c) An investment rises from \$2500 to \$3375. Express the increase as a percentage of the original. [3]

(d) Use the currency conversion table shown to answer questions that follow

Currency	Code	USD/1 unit	Units/ 1 USD
Australian Dollar	AUD	0.9612	1.0405
Canadian Dollar	CAD	0.9788	1.0219
Euro	EUR	1.3065	0.7655
British Pound	GBP	1.5553	0.6431
Indian Rupee	INR	0.02174	46.1225
Japanese Yen	JPY	0.011916	83.9337

(i) Mr. Brown converts USD500 to Canadian dollars. Use the table given to calculate how much he receives. [3]

(ii) A tourist converts 400 British pounds to US dollars. Use the table given to calculate how much she receives. [3]

(iii)If you convert 300EUR into Indian Rupees how much would you receive? [4]

[Total score=20]

Question Two

(a) Simplify

$\frac{2x-4}{5} - \frac{3x-2}{3}$ [3]

(b) Solve the equation

$2x^2 - 7x - 9=0$ [4]

Correct your answer to two decimal places.

(c) Determine the range of values for which the following inequality is true:

$-3x + 5 > 2x - 10$ [3]

(d) The demand and supply functions of a good are given by

$P = -2Q\,D + 50$

$P = \frac{1}{2}Q\,\mathrm{S} + 25$

where P , Q D and Q S denote the price, quantity demanded and quantity supplied respectively.

(i) Explain what is meant by market equilibrium. [3]

(ii) Determine the equilibrium price and quantity. [4]

(iii) Determine the effect on the market equilibrium if the government decides to impose a fixed tax of \$5 on each good. [3]

[Total score=20]

Question Three

(a) If fixed costs are \$4, variable costs per unit are \$ 1 and the demand function is $P = 10 - 2\,Q$ obtain an expression for π[the profit function] in terms of Q and hence sketch a graph of π against Q . [4]

(i) For what values of Q does the firm break even? [2]

(ii) What is the maximum profit? [4]

(b) Assume that fixed costs are \$ 850, variable cost per item is \$ 45, and selling price per unit is \$65. Write,

i. Cost function

ii. Revenue function

iii. Profit function [6]

(b) Given the demand function $P = 50 - 2\,Q$ find the elasticity when the price is 30. Is demand inelastic, unit elastic or elastic at this price [4]

[Total score=20]

Question Four

(a) Given the demand function, $Q = 250 — 5P$ where Q is the number of children's watches demanded at £P each. Calculate the point elasticity when the price, $P=$. 25. [4]

(b) Given the supply function, $P = 20 + 0.5Q$, calculate the point price elasticity of supply when price is £40. [4]

(c) The demand function of company is p = 42 -0.001 $\boldsymbol{x}$ and cost function is $C(\boldsymbol{x}) = 30x + 1200$, where x is the number of units demanded.

i. Find the profit function.

ii. Find the marginal profit function.

iii Calculate the profit for 1000 units [12]

[Total score=20]

Question Five

(a) Express 4.6 as:

(i) a ratio of 23.0; [2]

(ii) a percentage of 23.0. [2]

(b) Evaluate 30 per cent of 450. [2]

(c) The ratio of the earnings from a certain share to its price is 18.5. If the price is £1.50, what are the earnings? [2]

(d) If a variable, A, increases by 8 per cent, what does it become? [2]

(e) If a variable, B, changes to 0.945B, what percentage change has occurred? [2]

(f) Find the sum of the first eight terms of the series: 26 + 22+ 18+ 14 + • • • [4]

(g) How much is a sum £3500 worth at the end of five years if deposited at 11 % simple interest.[4]

[Total score=20]

Question Six

(a) Simplify

i. $x^{3/4}.x^{1/4}$ [2]

ii. $\frac{x^2.y^3}{x^4.y}$ [2]

(b) Find the value of x which satisfies:

i. $200(1.1)^x=20000$ [3]

ii. $5^x = 2.3^x$ [3]

(c) Find the sum of the first 12 terms of the series: $4 + 2 + 1 + \frac{1}{2} + \frac{1}{4}$- - -.. [3]

(d) A TV manufacturer plans to increase his output by 5% each month. If he is now producing 300 TVs per month, calculate, using series,

i. His monthly output in 15 months from now.

ii. His total output in 15 months, starting with the present month.

iii. The month in which his output reaches 500 [7]

[Total score=20]

Question Seven

a. Determine the first derivative of the following:

(i) $y= 7x^4$

(ii) $y = 4x^{3/4}$

(iii) $y=x^2 + 4x - 8$ [6]

b. Calculate the compound interest rate required for £5000 to grow to £9000 in four years. [4]

c. £5000 is invested for three years at 8% per annum compounded semi-annually.

i. Calculate the total value of the investment. [4]

ii. Compare the return on the investment when interest is compounded annually to that when compounded semi-annually. [6]

[Total score=20]

End

Formulae

The quadratic function: $f(x)= ax^2 +bx +c=0$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Arithmetic Series

$a+[a+d] +[a+2d] +[a+3d]+\ldots\ldots\ldots\ldots[a+(n-1)d]\ldots\ldots.$

First term is a

The common difference is d

The n^{th} term is $a+(n-1)d$

Sum of n terms is $\frac{n}{2}[2a +(n-1)d]$ or $\frac{n}{2}(a+l)$ where l is the last term

Geometric series

$ar+ar^2+ar^3\ldots\ldots\ldots+ar^{n-1}$

First term is a.

Common ratio is r

The n^{th} term is ar^{n-1}

Sum of n terms: $S_n=\frac{a(1-r^n)}{1-r}=\frac{a(r^n-1)}{r-1}$