

ARTHUR LEWIS COMMUNITY COLLEGE
DIVISION OF TECHNICAL EDUCATION AND MANAGEMENT STUDIES

DTEMS PAST PAPERS

MANAGEMENT STUDIES

EXAMINATION SESSION : April 2008 Examination
TUTOR (S) : Ms. L. Phillips, Mrs. A. Drysdale-Felix
Mr. C. Omerod
PROGRAMME TITLE : Applied Arts – Business Studies
PROGRAMME CODE : 3BS-ABA-AD
COURSE TITLE : Mathematics for Business
COURSE CODE : MAT106
CLASS (ES) : Year One
DATE : Tuesday 29th April 2008
COMMENCEMENT TIME : 9:00 a.m.
DURATION : Three (3) hours
INVIGILATOR (S) : Ms. E. Louisy Mr. M. Rene
Mrs. L. Mc. V-Simmons Ms. F. Paul
Ms. U. Joseph
Mrs. F. Beerom-Henry
ROOM (S) : TRA-0R-03
CEHI-1H-02

#M140
RESERVE

14 OCT

INSTRUCTIONS:

Section I: Answer ALL questions. Write all answers in the spaces provided on the examination paper.

Section II: Answer question two (2), question three (3) OR four (4) AND five (5) other questions.

Borrowing or lending is prohibited.

- ◆ Students are advised to use a pen to write this examination.
- ◆ Write your ID Number on *each* answer sheet.
- ◆ All cell phones must be turned off during the examination.
- ◆ **Note:** Bags, books as well as writing paper not given by the invigilator should be deposited at the front of the examination room or as otherwise indicated.
- ◆ Students must sign IN and OUT on the examination class list.

P.T.O. →

STUDENT ID NUMBER							

SECTION I

INSTRUCTIONS: Students are required to answer ALL questions in this section. Insert the answers in the spaces provided. Show all working on your answer paper.

- a) Determine the nature of the roots of the following:
 $6x^2 = 5x + 6$

(2 marks)
- b) State the co-ordinates (x, y) of the maximum point of the equation: $y = 8x - x^2$

(2 marks)
- c) Find the gradient of the line $4y - 8x = 3$

(2 marks)
- d) Solve for x : $4^{x-5} = 27$

(2 marks)
- e) Express as a single logarithm in terms of x, y, z:
 $8 \log x - \log y - 3 \log z$

(2 marks)
- f) Find the remainder when $x^3 - 3x^2 + 5x + 1$ is divided by $(x - 2)$

(2 marks)
- g) Express in log form:
 $(\sqrt{3})^4 = 9$

(1 mark)
- h) An AP is given by 8, 6, 4 ...; find the 40th term

(2 marks)
- i) Find the common ratio of the GP $\frac{1}{2}$ $\frac{1}{6}$ $\frac{1}{18}$...

(2 marks)
- j) Find the sum of n terms of the GP in 'i' above

(2 marks)
- k) If $y = \frac{1}{4}x^8 + 3x^2 + 10$ find $\frac{dy}{dx}$

(2 marks)
- l) Find $\frac{d^2y}{dx^2}$ given that $x^2y = 8$

(3 marks)
- m) Find the equation whose roots are -3, and $\frac{1}{2}$

(2 marks)

End of Section I

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STUDENT ID NUMBER							

SECTION II

INSTRUCTIONS: There are eleven (11) questions in this section. Students are required to answer question two (2), question three (3) OR question four (4) and any other five (5) questions. Show all working clearly and number each part correctly.

Question 2 – Compulsory

The tank company intends to market two types of containers. Each square container costs the company \$20 and each round container costs \$30. Each square container occupies 20 square units of floor space while each round container occupies 10 square units. \$12,000 is available per period to purchase containers of either type and 8,000 units of floor space is available to store them. Each container weighs 100 kg and the floor of the storage room will not support more than 45,000 kg. Each square container contributes \$30 to profit while each round container contributes \$20. Using graphic linear programming determine:

- a) How many of each type should the company produce per day to maximize the sales.
- b) Calculate the maximum sales. (18 marks)

EITHER

Question 3:

A company wants to recruit people to work for a ten-month period. It offers two different types of pay schemes:

- a) Starting salary of \$1,000 per month increasing by \$100 per month
- b) Starting salary of \$x increasing by 10% per month
 - i. Find the total paid by scheme A (3 marks)
 - ii. Find the total paid by scheme B in terms of x (3 marks)
 - iii. Find x so that the total paid by both schemes is the same (4 marks)

OR

Question 4:

- a) A woman accepts a job with a beginning salary of \$24,000 p.a. with an increase of 12% for each year for 10 years. What will be her salary in the last year of the job? (3 marks)
- b) An advertisement for a job states that the post carries a salary of \$10,000 p.a. rising by annual increments of \$450. During what year will the salary be \$19,450? (5 marks)
 - i. Find the total amount the job pays after twenty (20) years (2 marks)

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WORK ANY FIVE (5) QUESTIONS

Question 5:

- a) The demand function is: $P = 200 + 5q$.
Find expressions for i) total revenue and ii) marginal revenue. (4 marks)
- b) A rectangle has a perimeter of 80 cm. Find the maximum area. (4 marks)

Question 6.

- a) Mary Greene had \$30,000 to invest. She invested part of it at 10% and the remainder at 12%. If her income from the two investments was \$2,160, then how much did she invest at each rate? (5 marks)
- b) The infant mortality rate in country x is given by: $d = (1.8 \times 10^{28})(1.032)^{-y}$ where 'd' is the mortality rate as a function of the year 'y'. Find the infant mortality rates in 1950 and 2000. (Correct to one decimal place). (3 marks)

Question 7:

To make ends meet Ms. Smith works three jobs. Her total income last year was \$48,000. Her income from gardening was just \$6,000 more than her income from painting. Royalties from her textbook sales were one-seventh of the total money she received from gardening and painting. How much did she make from each source last year? (8 marks)

Question 8:

Apply suitable rules to find the derivatives of the following:

a) $y = (2x + 3)(x^2 - 5)$ (4 marks)

$$y = \frac{x + 8}{x^2 + x + 2} \quad (4 \text{ marks})$$

Question 9:

The daily profit for the Toy department of a store from the sale of dolls is given by $P(x) = -x^2 + 18x + 144$, where x is the number of dolls sold. Find the turning point and intercepts and then graph the function. (Do not use graph paper). (8 marks)

Question 10:

The supply and demand equations for a certain product are:

$3q - 200p + 1800 = 0$ and $3q + 100p - 1800 = 0$ respectively, where 'p' represents the price per unit in dollars and 'q' represents the number of units per time period.

- i) Find the equilibrium price algebraically. (4 marks)
- ii) Sketch the curves (4 marks)

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Question 11:

- a) Given that the remainder is 7 when $f(x) = ax^3 - 2x^2 + 3x + 5$ is divided by $(x + 1)$, find a (2 marks)
- b) Show that $12x^3 + 16x^2 - 5x - 3$ is divisible by $2x - 1$ and then find all the other factors of the expression. (6 marks)

Question 12:

- a) Use laws of indices to simplify $\frac{3^{2n+1} x 9^{-n/2}}{27 \left(\frac{2}{3}\right)^{-n}}$ (4 marks)
- b) Use quadratic formula to solve: $1.85x^2 + 6.72x + 36 = 0$ (4 marks)

END OF EXAMINATION

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FORMULAE

1. $L = a + (n-1)d$

2. $L = ar^{n-1}$

3. $S_n = \frac{n}{2}[2a + (n-1)d]$ OR $S_n = \frac{n}{2}(a + L)$

4. $S_n = \frac{a(1-r^n)}{1-r}$ OR $S_n = \frac{a(r^n-1)}{r-1}$