

ITEMS PAST PAPERS
MANAGEMENT STUDIES

SIR ARTHUR LEWIS COMMUNITY COLLEGE
DIVISION OF TECHNICAL EDUCATION AND MANAGEMENT STUDIES

EXAMINATION SESSION : May 2001, Final Examination
TUTORS : Ms. L. Phillips
PROGRAMME TITLE : Applied Arts – Business Studies
PROGRAMME CODE : ABS – Year One
COURSE TITLE : Business Mathematics II
COURSE CODE : MAT 317
CLASS(ES) : Year One
DATE : 17th May 2001
TIME : 1:00 a.m.
DURATION : 3 hours
ROOM : Conference Room
INVIGILATOR : Ms. L. Phillips/Mrs. Mc.Vane Simmons

#M1



INSTRUCTIONS:

This paper contains Two (2) Sections.

You are required to do the following:

SECTION I : Answer **ALL** questions

SECTION II : Answer Question **One (1)** and **five (5) other Questions**. Show all working neatly and clearly.

Graph paper and foolscap sheets will be provided by the invigilator.

NO borrowing or lending is permitted.



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SECTION ONE

Instructions: Answer **ALL** questions. Write the correct answers in the spaces provided.
Show all working on a separate sheet of paper clearly and neatly.

- (a) Determine the nature of the roots of the following:
 $2x^2 - 5x + 3 = 0$ _____ [2 marks]
- (b) Simplify and express with positive indices:
 $(x^2 y^{-1})^2 - x^{-4}$ _____ [2 marks]
- (c) Solve for x : $0.8^x = 0.4$ _____ [1 mark]
- (d) Simplify : $\log_a a^2 \div \log_a a$ _____ [1 mark]
- (e) What is the n^{th} term of the A.P.
4, 4.1, 4.2, 4.3? _____ [2 marks]
- (f) If 5, x , y , 320 are in GP
Find x and y _____ [2 marks]
- (g) Solve : $\int \frac{1}{x} dx$ _____ [2 marks]
- (h) Find the derived function of:
 $1 + \frac{2}{x^2}$ _____ [1 mark]
- (i) If $xy = 8$, find $\frac{d^2y}{dx^2}$ _____ [2 marks]
- (j) Solve: $x^2 - x - 1 = 0$ _____ [2 marks]
- (k) Find the value of the unknown if
 $x^4 - 3x^2 - 2x + a$ is divisible by $x + 1$ _____ [2 marks]
- (l) Find the slope given
 $3x = 8 + 3y$ _____ [1 mark]
- (m) Find $f^{-1}(x)$ of : $(x^2 + 1)^5$ _____ [2 marks]
- [22 marks]

1945

1946

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SECTION II

There are nine (9) questions in this section. You are required to answer question one and five (5) other questions.

Question 1 - Compulsory (18 marks)

The King Concrete Company manufactures bags of concrete mix from beach sand and river sand. Each pound of beach sand costs 6 cents and contains 4 units of fine sand, 3 units of course sand, and 5 units of gravel. Each pound of river sand costs 10 cents and contains 3 units of fine sand, 6 units of course sand, and 12 units of gravel. Each bag of concrete must contain at least 12 units of fine sand, 12 units of course sand and 10 units of gravel. Graphically, find the best combination of beach sand and river sand which will meet the minimum requirements of fine sand, course sand, and gravel at the least cost, and indicate the cost per pound.

Question 2

- (a) Sketch the graph of the parabola using the extreme point, the y - intercept and the x - intercept.

$$y = -2x^2 - 6x \quad [7 \text{ marks}]$$

- (b) Show that $3x^3 + x^2 - 8x + 4$ is zero when $x = 2/3$ and hence factorize the expression. [5 marks]

Question 3:

- (a) Solve the following system of equations algebraically:

$$\begin{aligned} 5x + 6y - 3z &= 6 \\ 4x - 7y - 2z &= -3 \\ 3x + y - 7z &= 1 \end{aligned} \quad [8 \text{ marks}]$$

- (b) Simplify:

$$10^{\frac{1}{2}n} \times 15^{\frac{1}{2}n} \times 6^{\frac{1}{2}n} \div 45^{\frac{1}{2}n} \quad [4 \text{ marks}]$$

Questions 4:

- (a) i. Evaluate the given limits:

$$\lim_{x \rightarrow 2} \frac{4x - 8}{x^2 - 4} \quad [2 \text{ marks}]$$

ii. $\lim_{x \rightarrow \infty} \frac{3x^3 + 5}{x^2 - 2}$ [3 marks]

iii. $\lim_{x \rightarrow 4} \sqrt{25 - x^2}$ [2 marks]

- b) Solve the following non-linear system of equations:

$$\begin{aligned} x^2 &= y^2 + 14 \\ y &= x^2 - 16 \end{aligned} \quad [5 \text{ marks}]$$

Question 5

- (a) Express in partial fractions:

$$\frac{3}{x(3x-1)^2}$$

[6 marks]

- (b) The fourth term of an AP is 15 and the sum of the first five terms is 55. Find the first term, the common difference and write down the first five terms.

[6 marks]

Question 6

- (a) A firm has monthly average costs given by:

$$C = \frac{50,000}{X} + 10 + x^2$$

Where x is the number of units produced per month. The firm can sell its product in a competitive market for \$4,000 per unit.

- i. Find the number of units that give maximum profits [4 marks]
- ii. Find the maximum profit [2 marks]
- (b) In a geometric progression the sum of the second and third term is 6 and the sum of the third and fourth term is -12 . Find the first term and the common difference. [6 marks]

Question 7:

- (a) Evaluate the following:

$$\int_3^6 \left(\frac{1}{\sqrt{x}} + 2 \right) dx$$

[3 marks]

- (b) If the total cost function for a commodity is:

$$C(x) = 2x^2 + 54x + 98$$

- i. How many units will minimise average costs? [4 marks]
- ii. Find the minimum average cost. [2 marks]
- (c) Solve for y in terms of x : $\log_5 x + \log_5 y = \log_5 3 + 1$ [3 marks]

Question 8.

- (a) The total revenue function is given by:

$$\frac{2x^2 - x - 1}{x^3 + 2x^2}$$

Find the marginal revenue function.

[4 marks]