

UNIVERSITY OF SWAZILAND



Final Examination 2005

- Title of Paper** : Elementary Quantitative Methods
- Program** : B.A. Hums./B.A.S.S. I
- Course Number** : MS 001 (i)
- Time Allowed** : Three (3) Hours
- Instructions** :
1. This paper consists of SEVEN questions on FOUR pages.
 2. Answer any five (5) questions.
 3. Non-programmable calculators may be used.
- Special Requirements:** None

THIS EXAMINATION PAPER MAY NOT BE OPENED UNTIL PERMISSION TO DO SO IS GRANTED BY THE INVIGILATOR.

Question 1

(a) Express as a single fraction in its simplest form

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

[5 marks]

(b) Evaluate $2 + 10008x^0$ leaving your answer in std form.

[5 marks]

(c) Simplify fully

$$\frac{4m^4n^5r^{17}}{3d^4q^3} \div \frac{2m^2n^4r^3}{5yd^5}$$

[10 marks]

Question 2

(a) Factorise the following expressions

(i) $3y^5x^7z - 12x^3y^8z^3$

[4 marks]

(ii) $4x^2 - y^2$

[4 marks]

(iii) $3m^2x - 4n^2y^2 - 3m^2y^2 + 4n^2x$

[6 marks]

(b) A solid cylinder of radius r centimetres and height h centimetres has a volume of $100\pi \text{ cm}^3$. Show that

$$h = \frac{100}{r^2}$$

[6 marks]

Question 3

A trader bought some paraffin for E500. He paid Ex for each litre of paraffin.

(a) Find, in terms of x , an expression for the number of litres he bought.
[3 marks]

(b) Due to a leak, he lost 3 litres of paraffin. He sold the remainder of the paraffin for E1 per litre more than he paid for it. Write down an expression, in terms of x for the sum of money he got.
[5 marks]

(c) He made a profit of E20. Write down an equation in x to represent this information, and show that it reduces to $3x^2 + 23x - 500 = 0$.
[8 marks]

(d) Solve the equation $3x^2 + 23x - 500 = 0$, giving answers correct to one decimal place.
[4 marks]

Question 4

(a) Given that $\log_3 4 = 1.262$ and that $\log_3 5 = 1.465$, find $\log_3 20$.
[5 marks]

(b) Solve the following logarithmic equations

(i) $2 \log_5 x = \log_5(2x^2 - 4)$
[6 marks]

(ii) $\log_3(x^2 + 2) = 1 + \log_3(x + 2)$
[9 marks]

Question 5

(a) Find the balance after 4 years if E5000 is invested into an account offering 7% interest compounded

(i) Annually;

[5 marks]

(ii) Semi-annually.

[6 marks]

(b) After how many years will a principal amount of E800 triple if invested into an account offering 9% interest compounded quarterly?

[8 marks]

Question 6

(a) Solve the simultaneous equations

$$x + y = 5$$

$$x - y = 7$$

[3 marks]

(b) The first three terms of an AP are $x + 3$, $2x + 6$ and 8. Find the value of x and the sum of the first 12 terms.

[7 marks]

(c) Show that $x + 1$, $x + 3$ and $x + 5$ cannot be three consecutive terms of a GP, whatever the value of x .

[10 marks]

Question 7

(a) The price of petrol was increased by 10% in March and in November was reduced by 10%. Find the percentage decrease in these nine months.

[5 marks]

(b) Mpho bought a bicycle for E800 and sold it to Siphho at a loss of 12%. Later, Siphho sold it to John at a loss of 10%. How much did John pay for it?

[6 marks]

(c) If a car travelled 20 km/h faster, it would take 2 hours less to complete a journey of 630 km. Find its present speed.

[9 marks]

***** END OF EXAMINATION *****