

# UNIVERSITY OF SWAZILAND



## Supplementary Examination 2005

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- Title of Paper** : Elementary Quantitative Methods
- Program** : B.A.S.S./B.A.(Hums.) 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

$$\frac{3}{x} - \frac{6x}{2x-1}$$

[5 marks]

(b) Evaluate  $7 + 30003x^0$  leaving your answer in std form.

[5 marks]

(c) Simplify fully

$$\frac{6a^8b^8c^{17}}{9d^4e^3} \div \frac{3a^2b^4c^3}{12ed^5}$$

[10 marks]

Question 2

(a) Factorise the following expressions

(i)  $17x^4y^3z^3 - 68y^3x^5z$

[4 marks]

(ii)  $16x^2 - 9y^2$

[4 marks]

(iii)  $3p^2q - 4q^2r^2 - 3p^2r^2 + 4q^2s$

[6 marks]

(b) A rectangular box with square base has a volume of  $400 \text{ cm}^3$ . If each side of the square base is of length  $s$  cm, and the height of the box is  $h$ , show that

$$h = \frac{400}{r^2}.$$

[6 marks]

**Question 3**

A trader bought some milk for E800. He paid  $Ex$  for each litre of milk.

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

(b) Due to theft, he lost 10 litres of milk. He sold the remainder of the milk for E3 per litre more than he paid for it. Write down an expression, in terms of  $x$  for the sum of money he received from the sale. **[5 marks]**

(c) He made a profit of E50. Write down an equation in  $x$  to represent this information, and show that it reduces to  $3x^2 + 8x - 240 = 0$ . **[8 marks]**

(d) Solve the equation  $x^2 + 8x - 240 = 0$ , and hence determine the amount of money the trader paid for each litre of milk. **[4 marks]**

**Question 4**

(a) Given that  $\log_2 30 = 4.907$  and that  $\log_2 5 = 2.322$ , find  $\log_2 6$ . **[5 marks]**

(b) Solve the following logarithmic equations

(i)  $2\log_3 y = \log_3(2y^2 - 4)$  **[6 marks]**

(ii)  $\log_4(x^2 + 2) = 1 + \log_4(x + 2)$  **[9 marks]**

**Question 5**

(a) Find the balance after 5 years if E15000 is invested into an account offering 8% interest compounded

(i) Annually;

[5 marks]

(ii) quarterly.

[6 marks]

(b) After how many years will a principal amount of E2000 double if invested into an account offering 12% interest compounded semi-annually?

[8 marks]

**Question 6**

(a) Solve the simultaneous equations

$$3x + 5y = 7$$

$$2x - 3y = -8$$

[3 marks]

(b) The first three terms of an AP are  $x$ ,  $2x - 1$  and 10. Find the value of  $x$  and the sum of the first 9 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 8% in March and in November was reduced by 8%. Find the percentage increase/decrease in these nine months.

[5 marks]

(b) If a car travelled 20 km/h faster, it would take 1 hour less to complete a journey of 400 km. Find its present speed.

[6 marks]

(c) Mpho bought a car for E80,000 and sold it to Sipho at a loss of 12%. Later, Sipho sold it to John at a loss of 10%. How much did John pay for it?

[9 marks]

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