



ZIMBABWE

MINISTRY OF HIGHER AND TERTIARY EDUCATION

HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)

NATIONAL CERTIFICATE

IN

BUSINESS AND MANAGEMENT STUDIES

SUBJECT: Business Mathematics and
Statistics

PAPER NO: 310/S03

OCTOBER/NOVEMBER 2012 EXAMINATION

REQUIREMENTS

1. Mathematical formulae
2. Annuity and log table
3. Graph paper

INSTRUCTIONS TO CANDIDATE

1. Answer ALL questions.
2. Start each question on a new page.
3. Show all necessary working.
4. Leave answers correct to 2 decimal places unless stated otherwise.

Lorenz $\frac{\% \text{ monthly}}{\text{last}} \times 100$
egive midpoint $\times$ frequency
Z chart $\Rightarrow$ total first
total $+ y^2 - y^1$
Note $P1 - \left(\frac{1}{1+i}\right)^n$

$Ar = \frac{\theta}{360} \times 2\pi r$
 $S. Area = 2\pi r^2 + 2\pi r h$
 $T.S. Area = 2\pi r h$
 $Acc \Rightarrow S = \frac{P(1+i)^n}{i}$

$$A = \frac{P(1+i)^n}{i}$$

This paper consists of 4 printed pages.

QUESTION 1

Solve the following equations:

a) $\frac{9}{x+2} = \frac{7}{2x+1}$ (3 marks)

b) $\log(x-1) + \log(x+1) = 2 \log(x+2)$ (5 marks)

c) $y = 5x - 4 - 2x^2$
 $y = 6x - 7$ (5 marks)

QUESTION 2

Tickets for a football match were priced at \$5, \$8 and \$12. The number of \$5 tickets sold were twice the number of \$8 tickets. The number of \$12 tickets sold was 80 more than the number of \$8 tickets. The number of \$8 tickets sold was x .

- a) Find an expression in terms of x for the sum of money received from the sale of the tickets. $5x + 2x + (80+x)$ (4 marks)
- b) Given that \$9 360 was received from the sale of the tickets, form an equation in x and solve this equation to find the total number of tickets that were sold. (4 marks)

QUESTION 3

In 2010 the price of petrol was \$1,20.

- a) Tendai bought as many litres of petrol as she could with a \$20 note.
- i) Calculate how many litres she bought. (3 marks)
- ii) Calculate how much change she received. (2 marks)
- b) In 2011 the price of one litre of petrol was \$1,30. Calculate the percentage increase in the price of petrol from 2010 to 2011. (4 marks)
- c) The price in 2010 was 10% less than the price in 2009. Calculate the price of one litre of petrol in 2009. (4 marks)

amount to be raised $\times 100\%$
 rateable value

10.67

2010 = 10% $\times 2009$
 2009 = 110%
 2010 = 90%

2

120
 240
 360
 480
 600
 8.3

QUESTION 4

- a) A mother and her daughter both enter the cake competition at a show. The probability that the mother wins a prize is $\frac{1}{6}$ and the probability that her daughter wins a prize is $\frac{2}{7}$.

Assuming that the two events are independent, find the probability that:

- i) Either the mother or the daughter but not both wins a price. (3 marks)
 ii) None of them wins a prize. (2 marks)
- b) The mean of n numbers is 5. If the number 13 is added to the n numbers, the new mean is 6. Find the value of n . (5 marks)

QUESTION 5

Each of 50 sports person was asked to state the distance x km, he needs to travel to obtain access to suitable training facilities. The results are summarised in the table below:

Distance (X)	Number of Sports
$0 \leq x < 4$ $0+4 \div 2 = 2$	1
$4 \leq x < 10$ $10+4 \div 2 = 7$	2
$10 \leq x < 20$ $10+20 \div 2 = 15$	6
$20 \leq x < 35$ $20+35 \div 2 = 27.5$	19
$35 \leq x < 60$ $35+60 \div 2 = 47.5$	12
$60 \leq x < 100$ $60+100 \div 2 = 80$	10

- a) Construct the cumulative frequency table for the distribution and draw the cumulative frequency curve. (10 marks)
- b) Use the graph to estimate:
- i) The medium distance (2 marks)
 ii) The percentage of sports persons who need to travel more than 30 km. (3 marks)

QUESTION 6

- a) A business firm must make disbursement of \$800 at the end of each year from 2008 to 2011 inclusive. In order to meet the obligations as they fall due, it must deposit in a fund at the beginning of 2008 an amount that will be just sufficient to provide the necessary payments. If the interest rate is 3% compounded annually, what sum should be deposited? (6 marks)
- b) On January 1 2002, a company borrowed \$5 000 from a bank and the debt was discharged on December 31 2006 with a payment of \$6 100. Assuming that the interest was compounded annually, what was the interest rate that was paid? (6 marks)

QUESTION 7

- a) Define the following terms in relation to data collection:
- i) Population (2 marks)
 - ii) Sample (2 marks)
 - iii) Questionnaire (2 marks)
- b) A decision has to be made about how data will be collected. You have to choose between a postal survey, face to face interviews and telephone interviews and you wish to contact at least 1000 people.
- i) Which method is the most expensive? ^{tel} (2 marks)
 - ii) Which method is the least expensive? ^{face to face} (2 marks)
 - iii) Which method is the quickest to carry out? ^{tel} (2 marks)

QUESTION 8

- a) A solid cuboid measures 7cm by 5 cm by 3 cm.
- i) Calculate the total surface area of the cuboid. (3 marks)
 - ii) A cube has the same volume as the cuboid. Calculate the length of an edge of this cube (4 marks)
- b) In a group of 100 students, 80 study Shona and 35 study Ndebele. x students study Shona and Ndebele and y students neither of the two subjects.
- Handwritten: $7 \times 5 \times 3 =$
 $2\pi r^2 + 2\pi rh$
 $3200 - \left(\frac{4}{4+6}\right)$
 $100 - (80 + 35 - x) = y$*
- i) Illustrate the information on a venn diagram. (3 marks)
 - ii) Find in its simplest form an expression for y in terms of x . (3 marks)
 - iii) Find the least possible value of x (2 marks)
 - iv) Find the greatest possible value of y (2 marks)

Handwritten:
 $S = P(1+i)^n$
 $(1/6) = (1/4)(P(1+i)^n)$
 $50 = P(1+i)^n$
 $\frac{50}{P} = (1+i)^n$
 $\ln \frac{50}{P} = n \ln(1+i)$
 $\ln \frac{50}{P} = n \ln 1.03$

Handwritten:
 $\sqrt{105}$
 $= 10.2469$
 $= 10.25 \text{ cm}$

Handwritten:
 $P(1 - (\frac{1}{1+i})^n)$
 $3200 - \left(\frac{1}{1+3\%}\right)^4$
 3%
 $3200 - \left(\frac{1}{1+0.03}\right)^4$
 0.03