

THE PUBLIC ACCOUNTANTS EXAMINATIONS BOARD

A Committee of the Council of ICPAU

ATC(U) EXAMINATIONS

LEVEL ONE

BUSINESS MATHEMATICS & STATISTICS - PAPER 3

WEDNESDAY, 21 JUNE 2006

INSTRUCTIONS TO CANDIDATES:

1. Time allowed: **3 hours**
2. Attempt **all** questions in Section A, any **two** questions in Section B and any **two** questions in Section C.
3. Section A has **twenty** compulsory multiple-choice questions, each carrying $1\frac{1}{2}$ marks.
4. Section B has **three** questions and only **two** are to be attempted. Each question carries 20 marks.
5. Section C has **three** questions and only **two** are to be attempted. Each question carries 15 marks.
6. Please read further instructions on the answer booklet.

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SECTION A

Question 1:

- (i) Solve the equation:

$$\frac{5x-1}{4} - \frac{7x+4}{8} = 0$$

- (a) $-\frac{2}{3}$
 (b) 2
 (c) $\frac{2}{3}$
 (d) -2

Use the following information to answer questions (ii) and (iii).

A student on vacation working for MM Publishers in Busega earns Shs 120,000 per month for entering company data. In January 2006, the company's income was seriously affected by the constant electricity load shedding. As a result, all the employees' salaries and wages were cut by 20%. However, in February 2006, the company bought a generator and their work improved slightly. This prompted management to effect a 10% increase.

- (ii) How much money was the student paid at the end of February 2006?

- (a) Shs 95,600.
 (b) Shs 2,400.
 (c) Shs 105,600.
 (d) Shs 96,000

- (iii) Compute the percentage increase or reduction after February pay was made?

- (a) 12%.
 (b) 30%.
 (c) 10%.
 (d) 25%.

- (iv) Given the matrix
- $A =$

$$\begin{bmatrix} 2 & 1 \\ 8 & 4 \end{bmatrix}$$

Find the inverse of A:

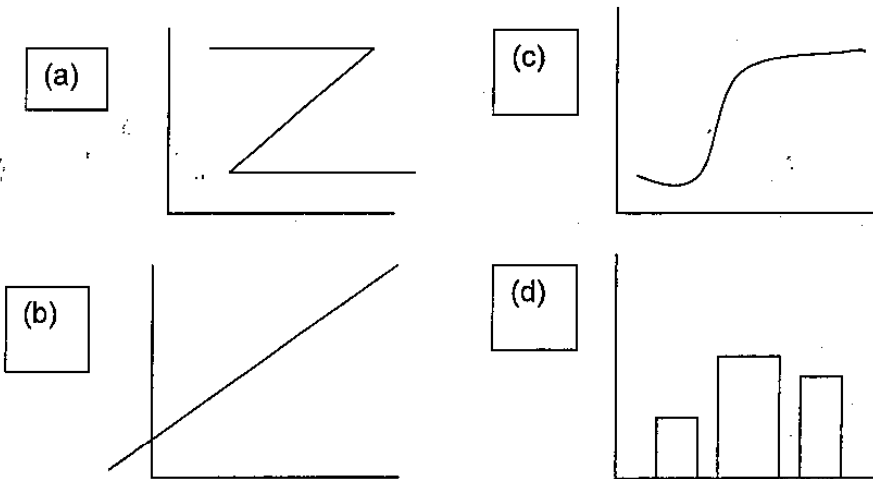
- (a) It does not exist.

(b) $\begin{bmatrix} 2 & 1 \\ 8 & 4 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

(d) $\begin{bmatrix} 4 & -1 \\ -8 & 2 \end{bmatrix}$

- (v) Which of the following conditions satisfies positive skewness?
- (a) When the median is equal to the mode.
 - (b) When the mean is less than the median.
 - (c) When the median is less than the mode.
 - (d) When the mean is greater than the mode.
- (vi) Which of the following graphs represents an ogive?



- (vii) The arithmetic mean of four members namely 5, 6, X and 12 is 8. Find the value of X.
- (a) 9.
 - (b) -15.
 - (c) -11
 - (d) 55.
- (viii) Which of the following is not a sampling distribution?
- (a) The student t-distribution.
 - (b) The F – distribution.
 - (c) The chi-square distribution.
 - (d) The Random sampling distribution.

- (ix) Tino Club recorded beer sales of 500 crates every weekend in 2004. In 2005 they increased to 1,200 crates. Find the quantity relative for 2005 (2004=100).
- (a) 240.
 - (b) 41.6.
 - (c) 120.
 - (d) 600.
- (x) A Sub-committee of 4 members is to carry out an inquiry into mismanagement of funds in the activities of an NGO. It is to be selected from the 20 Finance Managers in the Ministry of Finance. In how many ways can the committee of 4 be selected?
- (a) 4,845.
 - (b) 80.
 - (c) 104,280.
 - (d) 16.

Use the information below to answer questions (xi) and (xii).

The total revenue obtained (in Shs '000s) from selling x hundred cars in a particular day is given by R , which is a function of variable x .

- (xi) Given that $\frac{dR}{dx} = 30 - 6x$ determine the total new curve function of R .
- (a) 7.
 - (b) $30x - 6x^2$.
 - (c) $30 - 3x^2$.
 - (d) $30x + 6x$.
- (xii) Find the number of items sold in one day that will maximize the total revenue.
- (a) 5.
 - (b) 0.
 - (c) 10.
 - (d) -10.
- (xiii) 60% of the ATC students are males and 40% are females. 20% of the males take coffee, likewise 45% of the females. A student is chosen at random, find the probability that the student takes coffee?
- (a) 0.3
 - (b) 0.12
 - (c) 0.18
 - (d) 0.65

- (xiv) A RISO graph machine is valued at Shs 3,000,000 with a 6 year life. It is estimated to have a scrap value of Shs 500,000. If the depreciation fund earns 10%, use the sinking fund method based on an ordinary annuity to find the annual deposit into the fund.
- (a) Shs 300,000.
 - (b) Shs 155,183.
 - (c) Shs 2,250,650.
 - (d) Shs 300,650.

Use the following information to answer questions (xv) and (xvi).

Real Estate dealers sold the following houses on behalf of National Housing Corporation. 4 houses were sold at Shs 25,000,000 each and 5 houses at Shs 500,000,000 each. If their commission was 5% on first Shs 100,000,000, 3% for the next Shs 200,000,000 and 6% for the remainder:

- (xv) how much did the company receive after paying commission?
- (a) Shs 2,259,100,000
 - (b) Shs 155,900,000.
 - (c) Shs 144,900,000.
 - (d) Shs 2,555,100, 000.
- (xvi) what was percentage income of the Real Estate dealers to the income of National Housing Corporation?
- (a) 5.34%.
 - (b) 5.74%.
 - (c) 4.09%.
 - (d) 6.1%.
- (xvii) A sample of 25 fluorescent tubes was taken and found to have a mean life of 800 hours with standard deviation of 80 hours. Calculate the 95% confidence limit for the tubes.
- (a) (768.6, 806.3).
 - (b) (700.5, 842.3).
 - (c) (784, 816).
 - (d) (768.6, 831.4)
- (xviii) S.M.K. Holdings advertises goods at Shs 1,000,000 deposit and four equal annual payments of Shs 300,000. If the discount rate is 10%, calculate the present value of the goods.
- (a) Shs 683,010
 - (b) Shs 1,950,940
 - (c) Shs 950,940
 - (d) Shs 4,950,940

- (xix) The marks of 20 girls in an examination had a mean of 60 and variance 155. The marks of 25 boys had a mean of 58 and variance of 243. Find the variance of the combined group.
- (a) 204.9
(b) 398
(c) 149
(d) 208.7
- (xx) How long can it take money to double if it is invested at 18% compound continuously?
- (a) 3.85 years.
(b) 2 years.
(c) 4.51 years.
(d) 4 years.

SECTION B

Question 2

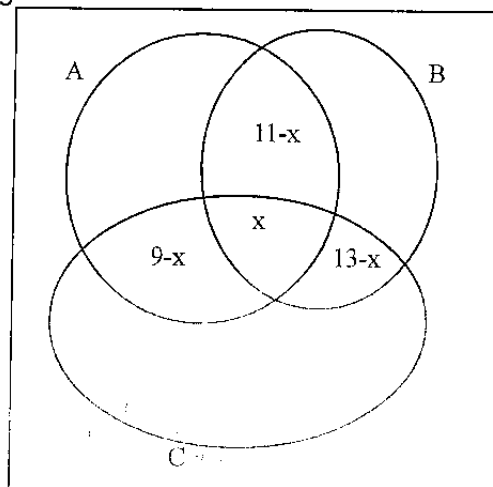
- (a) Complete the following statements.

- (i) $A \cap \varepsilon =$
(ii) $A \cup A =$
(iii) $A \cap A^1 =$
(iv) $A \cup A^1 =$

(4 marks)

- (b) In the June 2001, out of the 50 students who offered ATC Exams; 19 did Accounting (A), 28 did Business Maths (B) and 26 did Commercial Environment. (C). However, 4 students misread the time-table and instead came in the afternoon while the papers had been sat for in the morning.

Use the Venn diagram below to answer the questions that follow:



- (i) Copy and complete the Venn diagram. (8 marks)
- (ii) Find the number of students who did 3 papers. (4 marks)
- (iii) Find the number who did at least 2 papers. (2 marks)
- (iv) Find the probability that a student chosen at random did Business Mathematics. (2 marks)

(Total 20 marks)

Question 3

- (a) Solve for x and y.

$$\begin{bmatrix} 4 & 1 \\ x & 2 \end{bmatrix} \begin{bmatrix} 1 \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 7 \end{bmatrix}$$

(4 marks)

- (b) Joshua, Godwin and Phoebe went shopping. Joshua bought 3kg of sugar, 1 tin of 500g of blue band and 2 loaves of bread. Godwin bought 5 kgs of sugar, 2 tins of 500g of blue band and 3 loaves of bread while Phoebe bought 1kg of sugar, 2 loaves of bread and no blue band.

- (i) Write down this information in a 3 x 3 matrix form.

(4 marks)

- (ii) If the price of sugar was Shs 1,500 per kg., Shs 1,000 for a 500g tin of Blue Band and Shs 1,200 for a loaf of bread, use matrix multiplication to find the total amount of money that was spent by each individual.

(5 marks)

- (c) ICPAU has acquired 300 prizes to be distributed equally among a certain number of ATC candidates at the end of their course. If 10 more candidates, who were repeating papers the previous period join, each candidate would receive one prize less. Find the original number of ATC candidates.

(7 marks)

(Total 20 marks)

Question 4

- (a) Sanyu is an employee in a business company. She is paid a basic monthly salary of Shs 250,000 and a commission of 6% of her sales. In the first year her sales were Shs 30,000,000, in the second year Shs 36,500,000 and in the third year shs. 42,000,000.

Calculate Sanyu's:

- (i) gross salary in the first year.
- (ii) total earnings for the first two years.
- (iii) total commission in the last three years.

- (b) A loan of Shs 11,000,000 has to be repaid in two annual installments. If the interest rate is charged at 20% per annum compounded annually, find the amount of each installment. **(9 marks)**
- (c) Kamwe Kamwe Investors wish to save to buy a new pick-up. How much should they invest now at 10% compounded quarterly in order to have Shs 80,000,000 towards purchase of a pick-up in 5 years time. **(7 marks)**
- (4 marks)**
(Total 20 marks)

SECTION C

Question 5

- (a) Outline 3 factors a researcher would consider in selecting an appropriate data collection method. **(3 marks)**
- (b) The table below shows marks scored in an Accounting Examination in June 2002.

Score	Mid marks (x)	Frequency (f)	F (x)
41 – 49	-	-	450
50 – 58	-	16	-
59 – 67	63	25	1,575
68 – 76	-	-	864
77 – 85	-	13	-
86 – 94	90	4	360

- (i) Copy the table, fill in the missing figures and determine $\sum f$ and $\sum fx$. **(9 marks)**
- (ii) State the class width. **(1 mark)**
- (iii) Calculate the mean score. **(2 marks)**
- (Total 15 marks)**

Question 6

- (a) Define the term "Cost of Living Index". (2 marks)
- (b) Give at least **four** benefits of the cost of living index. (4 marks)
- (c) In the B.Com class at SM University, there are 500 students in Year One and 300 students in Year Two. In Year One, there are 100 girls and 50 girls in Year Two. A student is selected at random.
 - (i) Find the probability that the student is a girl. (5 marks)
 - (ii) If the selected student is a girl, calculate the probability that she is in Year Two.

(4 marks)

(Total 15 marks)

Question 7

- (a) Define the term skewness. (3 marks)
- (b) Give three differences between dispersion and skewness. (6 marks)
- (c) Calculate the standard deviation of the values 51, 47, 40, 75, 50, 48, 47, 51, 48, 43.

(6 marks)

(Total 15 marks)