

THE PUBLIC ACCOUNTANTS EXAMINATIONS BOARD

A Committee of the Council of ICPAU

ATC(U) EXAMINATIONS

LEVEL ONE

BUSINESS MATHEMATICS & STATISTICS - PAPER 3

WEDNESDAY, 13 DECEMBER 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.

SECTION A

Question 1

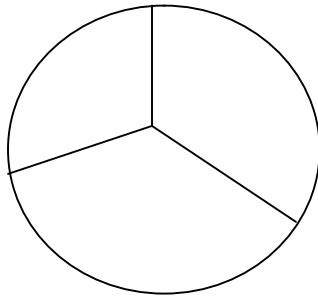
- (i) Find the ratio of 400 minutes to 40 hours.
 - (a) 10:1
 - (b) 1:6
 - (c) 100:10
 - (d) 60:1
- (ii) Calculate the amount to be paid after 12 years if Shs 50,000 is borrowed at 9% simple interest.
 - (a) Shs 54,000.
 - (b) Shs 45,000.
 - (c) Shs 104,000.
 - (d) Shs 10,400.
- (iii) Godfrey purchased a plot of land at Shs 45 million. Due to some problems he was forced to sell the same plot at Shs 35million. Find out his percentage loss on the selling price.
 - (a) 10%.
 - (b) 22.2%.
 - (c) 77.8%.
 - (d) 28.6%.
- (iv) Who of the following people are not paid a commission?
 - (a) Salesmen.
 - (b) Stock exchange brokers.
 - (c) Producers.
 - (d) Land agents.

Use the information to answer question (v) and (vi):

William does some part-time work at MUTEK Consults Ltd. He is paid Shs 20,000 per hour. In the month of August, he worked for 210 hours. He is also entitled to an overtime pay of Shs 23,500 per hour. In August, he put in 25 hours beyond the normal time schedule. From his earnings, PAYE of Shs 85,000, NSSF of Shs 4,500 and an advance pay of Shs 500,000 have to be deducted monthly.

- (v) Calculate the amount of his gross wages.
 - (a) Shs 4,198,000.
 - (b) Shs 4,832,500.
 - (c) Shs 4,787,500.
 - (d) Shs 5,287,500.

- (vi) Calculate the net amount payable to him at the end of the month of August.
- (a) Shs 3,998,000.
 - (b) Shs 4,243,000.
 - (c) Shs 4,198,000.
 - (d) Shs 4,200,000.
- (vii) The following pie-chart shows information about students who sat for the ATC(U) examinations during the June 2006 sitting:



- If 450 students sat for Business Mathematics, how many students sat for the ATC June 2006 examinations?
- (a) 1,000.
 - (b) 720.
 - (c) 400.
 - (d) 1,800.
- (viii) Solve for x : $x^2 + x - 6 = 0$.
- (a) -2, 3.
 - (b) -3, 2.
 - (c) 3, 2.
 - (d) -2, -3.
- (ix) The marks below were scored by 10 ATC candidates who sat for Principles of Law during the June 2005 examinations:
- 82, 79, 81, 83, 92, 83, 87, 94, 83, 77.
- State the median mark.
- (a) 94.
 - (b) 87.
 - (c) 82.
 - (d) 83.

- (x) The population of a suburb is 96,000 people. If the population is increasing by 5,800 people per year, determine the number of years it will take for the population to reach 125,500 people.
- (a) 1.3 years.
 - (b) 43.3 years.
 - (c) 5.09 years.
 - (d) 75.1 years

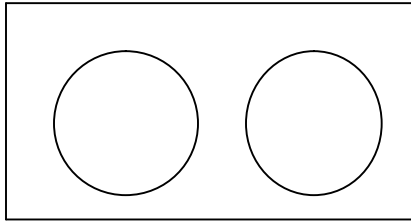
- (xi) ICPAU is doing research to determine the most cost effective method of setting up a number of computer terminals throughout the Institute. The Institute is considering the following two options:

- Option 1: A Shs 60,000,000 mini-computer whose terminals cost Shs 1,000,000 each.
- Option II: A Shs 20,000,000 network system whose terminals cost 3,000,000 each.

Find the number of terminals the Institute would install to make the total cost of the network system equal to the total cost of the mini computer.

- (a) 20.
 - (b) 6.
 - (c) 3.
 - (d) 30.
- (xii) Which of the following facts do not indicate the importance of statistics?
- (a) Eyes of Administration.
 - (b) Helpful in data processing.
 - (c) Shows connections between related factors.
 - (d) Increases man's experience.
- (xiii) The following are error types except.
- (a) sampling errors.
 - (b) biased errors.
 - (c) errors of origin.
 - (d) positive errors.

- (xiv) Which of the following sets best describe A and B?



- (a) universal sets.
 (b) disjoint sets.
 (c) empty sets.
 (d) intersection sets.
- (xv) Determine the co-ordinates of the maximum point on the curve represented by the following function:
 $Y = x^3 - x^2 - 5x + 4$.
- (a) $(\frac{5}{3}, 14.4)$.
 (b) $(-1, -3)$.
 (c) $14.4, \frac{5}{3}$.
 (d) $(1, 3)$.
- (xvi) Two tests for a typing certificate examination are designed, each to consist of a passage to be typed. The following criteria are to be used:
- Both tests should last 25 minutes.
 - The anticipated typing speed for test 1 is 36 words per minute, and for test 2 is 45 words per minute.
 - Both tests should contain the same number of words
- Calculate the number of words each test should contain:
- (a) 400.
 (b) 500.
 (c) 450.
 (d) 1,125.
- (xvii) Given that the co-efficient of variation is given by $\frac{\sigma}{x} \times 100\%$, find the coefficient of variation, if the variance is 16, the number of items is 20 and the sum of the items is 160.
- (a) 0.5%.
 (b) 8%.
 (c) 12.5%.
 (d) 50%.

(xviii) Shs 10 million was borrowed over a four year period at 14% compounded. Find the value of the outstanding debt at the end of the fourth year.

- (a) Shs 16.89 million.
- (b) Shs 45.6 million.
- (c) Shs 4.98 million.
- (d) Shs 14 million.

(xix) The table shows commodities and their prices for a two year period.

| | 2004 | | 2005 | |
|-------------|----------|----------|----------|----------|
| Commodities | Price | Quantity | Price | Quantity |
| | Shs '000 | Kg | Shs '000 | Kg |
| A | 2 | 8 | 4 | 6 |
| B | 5 | 10 | 6 | 5 |
| C | 4 | 14 | 5 | 10 |
| D | 2 | 19 | 2 | 13 |

Calculate Fisher's price index using 2004 as the base period.

- (a) 125.6
 - (b) 168.5
 - (c) 25.6%
 - (d) 68.5%
- (xx) The mean weight of 100 students in an ATC class is 50kg. The mean weight of the men in that class is 55kg and that for the women is 45kg. Find the number of men and number of women in that class
- (a) 55 men and 45 women.
 - (b) 45 men and 55 women.
 - (c) 60 men and 40 women.
 - (d) 50 men and 50 women.

SECTION B

Question 2

- (a) (i) Describe the terms square matrix and zero matrix.
 (ii) Give any **two** importances of matrices to an accounting technician.
(4 marks)
- (b) Give $A = \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 4 & -1 \\ 3 & 2 \end{pmatrix}$
 Find: (i) $A + 2B$
 (ii) $2AB$
(6 marks)
- (c) Solve the following simultaneous equations using matrix method:
 $4x + 2y = 8$
 $3x + y = 5$
(5 marks)
- (d) The partners A, B and C, invest money in a small business. The amounts they invest are Shs 100,000, Shs 120,000 and Shs 60,000 respectively. At the end of the first year of trading the profits from the business were Shs 143,500. If they share the profits in proportion to their investment, how much does each receive?
(5 marks)
(Total 20 marks)

Question 3

- (a) Define the following terms:
 (i) Depreciation.
 (ii) Sinking fund.
 (iii) Compound interest.
 (iv) Simple interest.
(4 marks)
- (b) $A = \{\text{all counting numbers up to } 20\}$
 $B = \{\text{all prime numbers less than } 20\}$
 Find $A \cap B^1$.
(4 marks)
- (c) A Dell computer, whose cost is \$1500, will depreciate to a scrap value of \$500 in 4 years.
 (i) Using the reducing balance method, find its depreciation rate.
(4 marks)
 (ii) What is the book value of the computer at the end of the third year?
(3 marks)

- (d) ABC Ltd has a non-interest current account at their bank from which a mortgage repayment of Shs 25,000 is made monthly. At the beginning of the year, the account contains Shs 3,000,000. MTZ Ltd has a similar account and monthly mortgage repayments are Shs 370,000 and the account contains Shs 4,150,000 at the start of the year.

Find how many more repayments ABC Ltd has to make on their account than MTZ Ltd.

(5 marks)

(Total 20 marks)

Question 4

- (a) The following are costs of a beverage firm in Kabale:

$$TC = 520 + 15x^2$$

$$P = 300 - 15x$$

TC = Total cost

P = price

- (i) Find the equation of the firm's profit.

(5 marks)

- (ii) Find the output of the company that maximizes profits.

(5 marks)

- (iii) Find the equation of marginal revenue

(3 marks)

- (b) Jomail Investment advertises sale of houses in the press. Zam Zam paid Shs 34,200,000 cash for a house which had a $33\frac{1}{3}\%$ trade discount and 5% cash discount.

Calculate the advertised sale price of that house.

(7 marks)

(Total 20 marks)

SECTION C**Question 5**

- (a) Describe the **three** components of a Z- chart. **(3 marks)**
- (b) A firm sells paper in bags of mean weight of 42 kg and standard deviation of 4 kg. Given that the weight is normally distributed, find:
- (i) the probability that the weight of any bag taken at random will lie between 43 kg and 44 kg. **(4 marks)**
- (ii) the percentage of bags whose weight exceeds 45 kg. **(4 marks)**
- (c) In the following frequency distribution, the frequency of the class intervals 40 – 50 is missing. It is known that the mean of the distribution is 52.

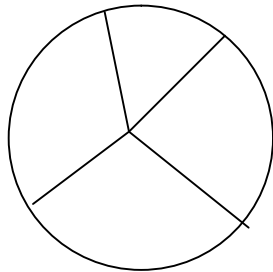
| Wage Shs '000 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---------------|-------|-------|-------|-------|-------|-------|-------|
| No of workers | 5 | 3 | 4 | - | 2 | 6 | 13 |

Find the missing frequency.

(4 marks)
(Total 15 marks)

Question 6

- (a) Define the following terms:
- (i) Census.
- (ii) Sample.
- (iii) Quota sampling.
- (iv) Secondary data. **(4 marks)**
- (b) The pie chart below shows the proportion (in degrees) of candidates who registered for Level III of ATC during the December 2005 examinations of ICPAU.



Paper 9: Management Accounting
 Paper 10: Taxation
 Paper 11: Business Management
 Paper 12: Financial Reporting

If those who registered for Management Accounting were 250, find the:

- (i) total number of candidates who sat for the Level III examinations in December 2005.
(4 marks)
 - (ii) proportions (in degrees), of those who sat for Management Accounting and Financial Reporting.
(2 marks)
 - (iii) total number of candidates who offered Taxation, Business Management and Financial Reporting.
(5 marks)
- (Total 15 marks)**

Question 7

- (a) Distinguish between the terms skewness and dispersion.
(4 marks)
 - (b) The following information was obtained from the records of a factory relating to wages:

| | Shs '000 |
|--------------------|-----------------|
| Arithmetic mean | 58.80 |
| Median | 59.50 |
| Standard deviation | 12.40 |

Calculate the:

 - (i) coefficient of variation.
 - (ii) skewness using Pearson's method.

(4 marks)
 - (c) Two balls are selected at random one after the other without replacement from a box containing 2 black balls and 3 red balls.
Find the probability that both balls picked:
 - (i) are of the same colour.
 - (ii) are of different colours.

(7 marks)
- (Total 15 marks)**