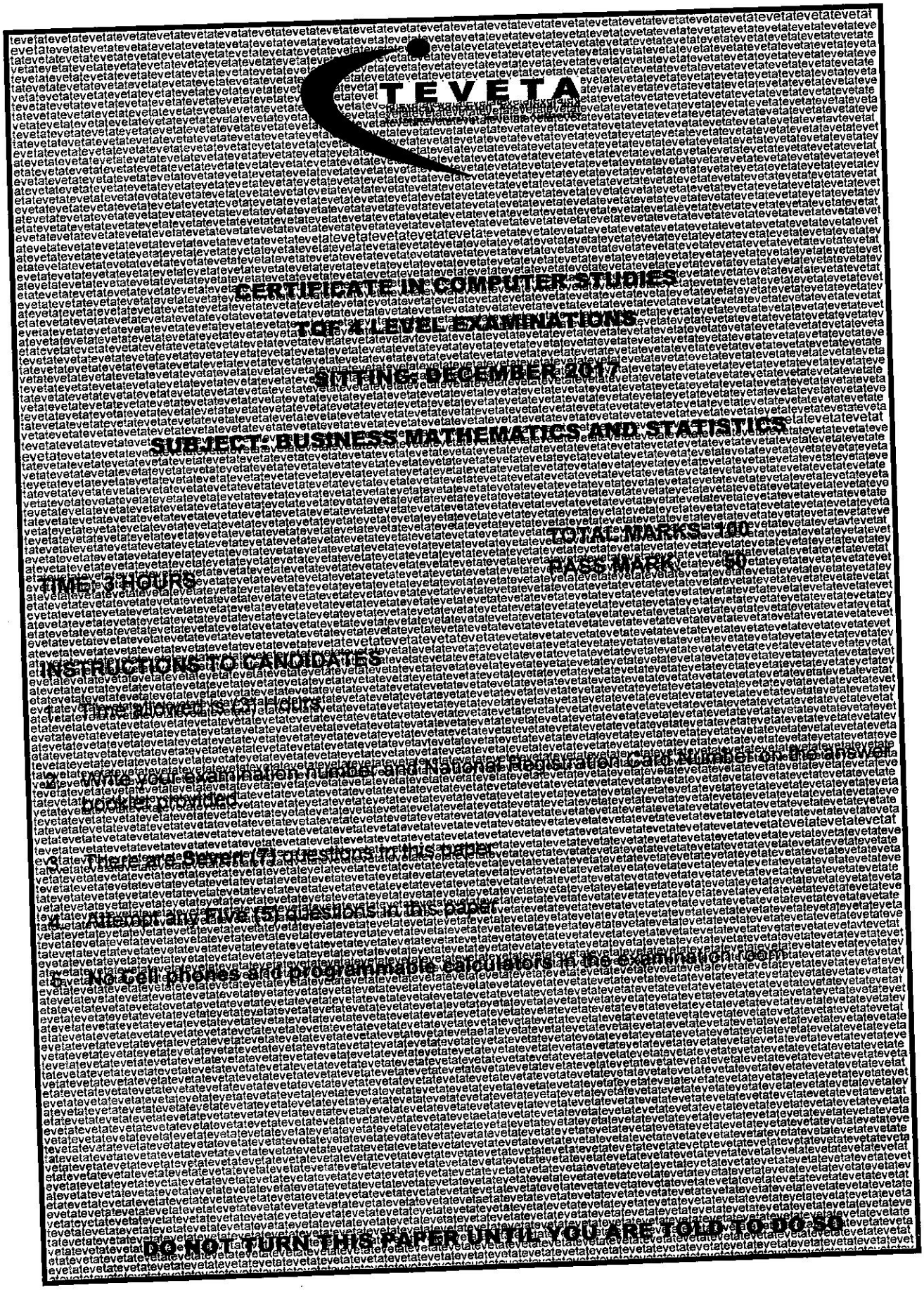
TEVETA
CERTIFICATE IN COMPUTER STUDIES
TOP 4 LEVEL EXAMINATIONS
SITTING: DECEMBER 2017
SUBJECT: BUSINESS MATHEMATICS AND STATISTICS
TIME: 3 HOURS
TOTAL MARKS: 100
PASS MARK: 50
INSTRUCTIONS TO CANDIDATES
1. Time allowed is 3 hours
2. Write your examination number and National Registration card number on the answer booklet provided
3. There are Seven (7) questions in this paper
4. Attempt any Five (5) questions in the examination room
5. No Cell phones and programmable calculators in the examination room
DO NOT TURN THIS PAPER UNTIL YOU ARE TOLD TO DO SO

QUESTION 1

(a) A company wants to know if they money they spend on advertising is effective in creating sales. The following data has been collected:

MONTHLY ADVERTISING EXPENDITURE (X) £	SALES IN FOLLOWING MONTH (Y) £
120	1325
90	985
160	1543
210	2014
160	1610

Required:

Calculate the Pearson's correlation co-efficient for the data and explain the results.

[12 Marks]

(b) James raised K44 286.17 in an account offering 8% and the compound interest semi-annually was K9,286.17. Find the period. [8 Marks]

[Total 20 marks]

QUESTION 2

(a) A farm estimates the revenue function of a product is given by $Rq = -q^3 + 90q + 320$ and cost function is given by $C(q) = 15q + 40$ where q is the number of products.

Required:

(i) Determine the profit fraction. [3 Marks]

(ii) Compute the maximum profit. [8 Marks]

(b) Solve using Cramer's method:

$$2p + 3q = 14 \quad / 1$$
$$3p - 2q = -5 \quad / 2$$

$6p + 9q = 42$ }
$6p - 4q = -10$ }
$13q = 52$
$q = 4$, [8marks]

(c) If in a pie chart a 40° sector represented 10,000 people, how many people would a 50° sector represent? [3 Marks]

$2p + 3(4) = 14$
$2p + 12 = 14$
$2p = 2$
$p = 1$

[Total 20 marks]

QUESTION 3

(a) A manufacturer know that if X (In hundreds) products are demanded in a particular week, the total cost function is $14 + 3x$ and the total revenue function is $19x - 2x^2$.

Required:

(i) Formulate the total profit function. [2 Marks]

(ii) Calculate the amount of profit obtained. [8 Marks]

(b) Determine the minimum turning point of the curve functions:

$$f(x) = \frac{x^2}{3} - \frac{11x^2}{2} + 30x$$

[10 Marks]

[Total 20 marks]

QUESTION 4

(a) The distribution of fertilizer from NCZ for farmer is shown below:

AMOUNT OF BAGS	NUMBER OF FARMERS
0 < 110	82
100 < 200	35
200 < 300	30
300 < 400	23
400 < 500	8
500 < 600	14
	192

Required:

(i) Draw the ogive. [9 Marks]

(ii) From the ogive above, estimate the median. [2 Marks]

(b) The text book cost K300 and sold off at K100 after four years. Find the book value at the end of third year using the straight line method. [5 Marks]

[Total 20 marks]

(c) Differentiate the function:

$$Y = \left(x^2 - 2x + 1\right)^{100}$$ [4 Marks]

QUESTION 5

(a) Compute the Skewness of:

15, 18, 14, 13, and 17. [11 Marks]

(b) (i) Given the following:

$$A = \begin{pmatrix} 3 & 4 \\ 5 & 6 \end{pmatrix} \quad B = \begin{pmatrix} 7 & 9 \\ 4 & 10 \end{pmatrix} \quad Find\ A - B$$ [3 Marks]

(ii) Simplify:

$$3\begin{pmatrix} 7 & 1 \\ 4 & 5 \end{pmatrix} - 2\begin{pmatrix} -2 & 4 \\ 6 & 8 \end{pmatrix}$$ [3 Marks]

(i) $$B = \begin{pmatrix} 2 \\ 6 \\ 7 \end{pmatrix} \quad A = \begin{pmatrix} 3 & 4 & 5 \end{pmatrix} \quad Find\ AB$$ [3 Marks]

[Total 20 marks]

A B

1×3 3×1

QUESTION 6

(a) Given the following matrix:

$$P = \begin{pmatrix} 2 & 3 & 5 \\ 4 & 1 & 6 \\ 1 & 4 & 0 \end{pmatrix}$$

Find the inverse matrix of P. [7 Marks]

(b) The mean salary of Shoprite workers is K800 and standard deviation is K67.
The salaries are normally distributed. Calculate the probability of a work with salary:

(i) Between K927 and K953 [5 Marks]

(ii) At least K798 [4 Marks]

(iii) At most K830 [4 Marks]

[Total 20 marks]

QUESTION 7

(a) Evaluate:

(i) $7C_4$ [2 Marks]

(ii) $10P_3$ [3 Marks]

(b) The average serving time of a customer at an ATM of a prominent bank is 3.4 minutes.
Complete the probability of:

(i) No customer served. [2 Marks]

(ii) Exactly one customer served. [2 Marks]

(iii) Not more than two (2) customers served. [3 Marks]

(iv) At most three (3) customers served. [4 Marks]

(v) At least three (3) customers served. [4 Marks]

[Total 20 marks]