ALUPE UNIVERSITY COLLEGE

...Bastion of Knowledge...

OFFICE OF THE DEPUTY PRINCIPAL

ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2019 /2020 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE (APPLIED STATISTICS WITH COMPUTING)

COURSE CODE: STA114
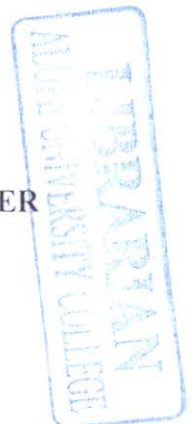
COURSE TITLE: COMPUTER APPLICATIONS FOR
DATA ANALYSIS

DATE: 13TH OCTOBER, 2020   TIME: 0900 – 1200 HRS

INSTRUCTION TO CANDIDATES

- SEE INSIDE

THIS PAPER CONSISTS OF 4 PRINTED PAGES   PLEASE TURN OVER

REGULAR – MAIN EXAM

STA 114: COMPUTER APPLICATIONS FOR DATA ANALYSIS

STREAM: ASC   **DURATION: 3 Hours**

INSTRUCTION TO CANDIDATES
Answer **ALL** questions from section A and **ANY THREE** Questions in section B.
All questions in section B carry Equal Marks
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SECTION A (31 marks): Answer ALL questions.

QUESTION ONE (16 Marks)

a) A Computer is an electronic device that can perform activities that involve Mathematical, Logical and graphical manipulations. List three operations in sequence that the computer performs.

[3Marks]

b) Define the following terms;

   i)   Program   [1Mark]

   ii)   Memory unit   [1Mark]

   iii) ASCII   [1Mark]

   iv)   RAM   [1Mark]

c) Explain the difference between Relation Schema and relation Instance.   [2Marks]

d) Explain the following variable type on a SPSS program

   i)   Numeric   [1Mark]

   ii)   Comma   [1Mark]

   iii) Dot   [1Mark]

   iv)   Scientific notation   [1Mark]

   v)   Date   [1Mark]

   vi)   Dollar   [1Mark]

   vii) string   [1Mark]

QUESTION TWO (15 marks)

a) Convert the following numbers respectively
   i)   Convert 11010001_2 to Octal   [2Marks]
   ii)   Convert 526_8 to binary   [2Marks]

b) Use Gaussian elimination to solve the system of linear equations   [4Marks]

$$2x_2 + x_3 = -8$$
$$x_1 - 2x_2 - 3x_3 = 0$$
$$-x_1 + x_2 + 2x_3 = 3$$

c) The yearly averages of K.S.C.E entries were tabulated as shown below.
   Find the estimate of missing terms.   [4Marks]

Year	2011	2012	2013	2014	2015	2016
No. of kcse entries	100	?	200	250	400	?

d) Express $\Delta^5 y_o$ in terms of $y_0, y_1, y_2 \ldots$ [3Marks]

SECTION B (39 marks):

Answer any THREE questions. All Questions carry equal marks

QUESTION THREE (13 marks)

a) Many persons are involved in the design, use and maintenance of any database. Discuss two types of persons who are involved in database.   [6Marks]

b) State four (4) advantages and three (3) disadvantages of database management systems.
                                                                            [7Marks]

QUESTION FOUR (13 marks)

a) Find the sum of 1010_2 and -1100_2 using once complements   [3Marks]

b) i) Obtain four corresponding values of $x_{20}, x_{40}, x_{60}, x_{80}, x_{100}$ and x_{120} given the equation
   $X_n = (1.02)^n X_O$ if $X_o = 100$.   [3Marks]
   ii) Sketch a curve of X_n against the responding values of n.   [3Marks]

c) Compute the next 3 terms of each of the following sequences from the given information.

   i) $X_o = 10, \ X_{n+1} = X_n + 4$ [1Marks]

   ii) $y_o = -1, \ y_{n+1} = \dfrac{1}{y_n}$ [1Marks]

   iii) $z_o = 2, \ z_{n+1} = z^2_n - z_n$ [2Marks]

QUESTION FIVE (13 marks)

a) Explain the following terms;

   i)   Hardware and software   [3Marks]

   ii)   Compilers and interpreters   [4Marks]

b) Discuss the three types of programming languages.   [6Marks]

QUESTION SIX (13 marks)

a) Solve the unknown values in the following system of equations by gauss elimination.

[6Marks]

$$x_1 - 2x_2 + 5x_3 = 12$$
$$2x_1 + 4x_2 + 12x_3 = -17$$
$$x_1 - x_2 - x_3 = 22$$

e) Given $u_1 = (12 - y)(4 + y), u_2 = (5 - y)(4 - y), u_3 = (y + 18)(y + 6)$ and $u_4 = 94$.

 Find the values of y such that 2nd degree difference of u are constant.   [7Marks]

QUESTION SEVEN (13 marks)

a) Given $f(x) = x^2 + x - 8$ and the roots lies in the initial $[1, 2]$. Find the;
   i) Initial approximation to the root using the bisection method.   [3Marks]
   ii) Second approximation   [3Marks]
b) Starting with $x_1 = 1$, find two approximation to the root using
   i)   Iteration method   [3Marks]
   ii)   Newton's method   [4Marks]

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