



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2013/2014

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE
IN INFORMATION TECHNOLOGY**

SIT 102 (CST 210) : INTRODUCTION TO STRUCTURED PROGRAMMING

DATE: 18TH DECEMBER 2014,

TIME: 2HRS

INSTRUCTIONS

Attempt QUESTION ONE and ANY other TWO

QUESTION 1 (30 MARKS): COMPULSORY

- (a) Define the following terms. (4 marks)
- i. Program
 - ii. Programming language
 - iii. Bugs
 - iv. Source code

- (b) A program is required to calculate interest earned from principal amount deposited in a bank for a given period of time. The interest rate depends on the principal amount deposited is as follows:

Principal Amount	Interest Rate Per Annum
Below 50,000	10%
50,000 and above	20%

The user first inputs the principal amount and duration in years. The program should:

Compute and display the interest amount earned and total amount after the expiry period. The program should also save the results on the database

HINT Interest = $P \times R \times T / 100$

Required:

- (i) Design pseudo code for above program. (6 marks)
- (ii) Design a flowchart for above program (6 marks)
- (iii) Write the program code for the above program. (6 marks)

(c) Differentiate between the following concepts

- i. Global variable and Local variable (2 marks)
- ii. Variable and constant (2 marks)
- iii. Operator and Operand (2 marks)
- iv. Character and Constant (2 marks)

Question 2 (20marks)

(a) Outline six principles to a good programming in C (6 marks)

b) Using examples differentiate between *in-built functions* and *user-defined functions* in C language. (4 marks)

c) Identify errors in each of the following code segments and indicate how they should be corrected. (6 marks)

(i) `char name[15];`
`printf("Enter Name");`
`scanf("%d", &name);`

(ii) `int num;`
`num = 2`

(iii) `int total="k";`

e) Write down the general syntax of the following selection structures (4 marks)

(i) *for loop*

(ii) "*if-else*" statement

Question 3 (20marks)

(a) Discuss three types of errors encountered in C programming. Give example in each category. (6 marks)

(b) Write a program that can be used to calculate the cost of items purchased by customer. The program requests user to input the number of items purchased and price per item then perform the calculation and display the results. (6 marks)

(c) Show the sequence of evaluating the following expression in C. What are the results of the expression (6 marks)

$$10+5/2*4\%5-2*2$$

(d) Write a program that declares and initializes a one dimensional array. (4 marks)

Question 4 (20marks)

(a) Define a *structure*. (2 marks)

(b) Explain how does a *structure* differ from an *array* (4marks)

(c) Give the general syntax for declaring a structure (4marks)

(d) What is operator precedence? Use example. (4marks)

b) Write an array program that can output the following on the screen

60 70 80 90 (6marks)

QUESTION 5

(a) (i) Define the term *function* (2marks)

(ii) Discuss three *benefits of using functions* when writing programs. (6marks)

(b) Write a function to *calculate area of a rectangle*. The function accepts two arguments representing the two dimensions of the rectangle. (6marks)

(c) Explain the use of the following escape codes. Write a program to show their usage in C language. (6marks)

i. `\n`

ii. `\t`

iii. `\a`