MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

FUNDAMENTALS OF COMPUTER PROGRAMMING

DATE:2/8/2016 **TIME:8.30-10.30 AM**

INSTRUCTIONS

Answer question one and any other two questions

1. a) Explain the meaning of the following teams
   i. Abstract data types
   ii. Data structure
   iii. Big O notation
   iv. Functional programming paradigm
   v. Object oriented programming paradigm (10 marks)

   b) Describe the following operations of a *stack*:
   i. Push()
   ii. Pop()
   iii. Is Empty. (3 marks)

   c) Explain the different types of program design. (4 marks)

   d) State and briefly discuss any **four** properties of an algorithm. (4 marks)

e) Write a flow chart to implement the following program. A program that accepts the basic salary of a worker and then outputs the PAYEE. Use the following information (5 marks)

Basic salary	PAYEE
>=30000	30% of basic salary
>=20000	20% of basic salary
<20000	15% of basic salary

f) Explain the **four** *search strategies* (4 marks)

2. a) Using *bubble sort*, illustrate how the following values can be sorted
36 24 10 6 12 (6 marks)

b) Discuss how the following sorting Algorithms work:

i) Merge sort

ii) Selection sort

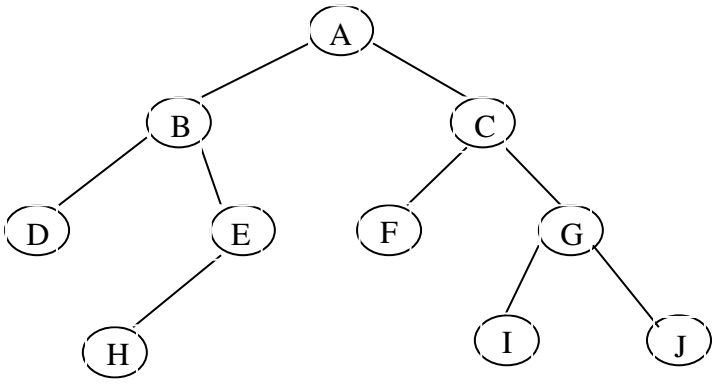
iii)Insertion sort (6 marks)

c) Define the term *divide and conquer* algorithm (2 marks)

d) Using a suitable example, show the general syntax for declaring an *array* explaining each of the parts used in the declaration. (4 marks)

e) Define the term *Data types* (2 marks)

3. a) Consider the given tree below;



Show the *traversal sequence* when searching for G using *depth first* search for:

i) Preorder traversal

ii) Inorder traversal

iii) Postorder traversal (6 marks)

c) Explain the meaning of the following terms

i. Syntax

ii. Source code

iii. Mnemonics

iv. Compiler (4 marks)

b) Given the following values, explain the execution of merge sort algorithm

8,5,7,3,12,23,56,45,12 (4 marks)

c) Explain the different parts of a *decision table* (4 marks)

e) Explain the meaning of the term **node** (2 marks)

4. a) Discuss the different types of *queues* (6 marks)

b) You have been provided with the following values, 2,10,8,5,4,16

sort the values clearly showing your working using:

i. Selection sort

ii. Insertion sort (6 marks)

c) Given the following scenarios, state and explain the most suitable ADT to use

i. Serving customers in a banking hall

ii. Deleting characters from text editor using back space key

iii. Checking if expression has the correct set of delimiters. (6 marks)

d) List any two types of data types used in C programming (2 marks)

5. a) Explain any **four** types of Feasibility studies conducted during program development life cycle. (4 marks)

b) Explain the meaning of the following terms giving examples for each

i) Homogenous data structures

ii) Linear data structures (4 marks)

c) Explain any **two** reasons that may lead to users rejecting a new program (2 marks)

d) Explain the meaning of the term *Flowchart* as used in programming. (2 marks)

e) List any **two** advantages of *low level languages* over *high level languages.* (4 marks)

f) Explain **two** categories of test data used in programming. (4 marks)