KASNEB

CICT PART II SECTION 3

STRUCTURED PROGRAMMING

THURSDAY: 24 November 2016. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

ALL programs written should be in C programming language.

QUESTION ONE

(a) List two ways of defining a constant in C programming language. (2 marks)

(b) Distinguish between the following terms as used in data structures:

(i) "Push function" and "pop function". (4 marks)
(ii) "Stack" and "queue". (4 marks)

(c) A programmer has five variables declared as follows:

```
int b1 = 20;
int b2 = 60;
int b3 = 100;
int b4 = 140;
int b5 = 180;
```

Required:
Declare and initialise the variable values in one statement using an array named "b". (4 marks)

(d) Study the program segment given below:

```
int main ( )
    {   float me    = 3.1;
        double you = 3.1;
        if (you == me)
        {
              printf ("We are in CICT Part II Section 3.");
        }
        else
        {
              printf ("We are in a different section of CICT Part II");
        }
        return 0;
    }
```

Required:
(i) Write the output of the above program. (2 marks)
(ii) Explain two reasons for the answer in (d) (i) above. (4 marks)
(Total: 20 marks)

QUESTION TWO

(a) Outline four ways that could be used to make a program easy to maintain. (4 marks)

(b) Write a C program using "while loop" that calculates the sum of the integers from 1 to 10 and terminates when the sum is greater than or equal to 20. (6 marks)

(c) Describe five operations that could be performed on an array. (10 marks)
(Total: 20 marks)

QUESTION THREE

(a) Distinguish between "a dangling pointer" and a "null pointer". (4 marks)

(b) Consider following variable declarations:

```
int a = 10;
int b = 15;
int c = 20;
```

Required:
Determine whether the following expressions are true or false:

(i) !(a < 10) (1 mark)
(ii) (b > = a) || (b = = c) (1 mark)
(iii) (b < c) && (c ! = 0) (1 mark)
(iv) (a < = 20) && (b > 1) (1 mark)

(c) Study the C language program extract given below:

```
# include <stdio.h>
int main ( )
    {
        int i ;
            for (i = 1; i < 30; i++)
              {
                if (i % 6 = = 0)
                {
                printf ("%d \n", i);
                }
              }
        return 0;
    }
```

Required:

(i) Explain the importance of "return 0". (2 marks)

(ii) Identify two relational operators in the above extract. (2 marks)

(iii) Write the output of the program. (4 marks)

(d) Outline four factors that determine the choice of a mobile application development platform. (4 marks)

(Total: 20 marks)

QUESTION FOUR

(a) State two disadvantages of recursive functions. (2 marks)

(b) Differentiate between the following terms in relation to structured programming:

(i) "Machine language" and "assembly language". (4 marks)
(ii) "Compiler" and "interpreter". (4 marks)
(iii) "Local variable" and "global variable". (4 marks)

(c) The following table shows the number of bags of fertilizer available in each shop:

Shop	Number of bags of fertilizer
A	1,250
B	2,100
C	3,000

Required:
Using "switch statement", write a C program that displays the number of bags of fertilizer when a particular shop is selected. (6 marks)

(Total: 20 marks)

QUESTION FIVE

(a) State two methods of writing comments in C programming language. (2 marks)

(b) Explain the use of "goto" statement in C programming language. (2 marks)

(c) Study the C program extract below:

```
#include <stdio.h>
#include <stdlib.h>
int  main ( )
   {
        char  *st[100];
        FILE *fp;
    fp  =  fopen ("class.txt", "r");
    fgets (st, 13,fp);
    printf ("% s", st);
    fclose (fp);
      return 0;
 }
```

Note: The file named "class.txt" contains the string "I am walking to class".

Required:

(i) Explain the function of "r" parameter. (2 marks)

(ii) State the importance of "fclose(fp)" statement. (2 marks)

(iii) Write the output of the above program. (2 marks)

(d) A program is required that could arrange 10 integer numbers in ascending order and display the result.

Using a function to sort the numbers, write a C program to accomplish the above task. (10 marks)

(Total: 20 marks)

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