THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME: LEVEL 03

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CPU 1141/CSU1180: INTRODUCTION TO COMPUTER PROGRAMMING / PROGRAMMING PERSPECTIVES & LANGUAGES

DURATION: **TWO HOURS (2 HOURS)**

DATE: **12th January, 2012** TIME: **1.30 p.m. to 3.30 p.m.**

Answer FOUR questions ONLY, selecting two questions from each part (Part A and Part B). Each question carries equal marks.

PART – A

Q1.

(i) What are *variables* in Pascal? Briefly explain in your own words.

(ii) Differentiate between *variables* and *constants* in Pascal.

(iii) What is meant by *data types* in Pascal? Name three (03) of them.

(iv) Declare a suitable Pascal variable or constant to represent the following data.

(a) To store the number of books in a shelf
(b) To store the value of π (3.141)
(c) To store the temperature of a room
(d) To hold the water capacity (in cubic meters) of a tank
(e) To hold the Boltzmann constant k (8.6×10^{-5})

(v) Four boys work together painting houses. For each house they paint, they get Rs. 256. The boys work for 4 months and their expenses are Rs. 152 per month.

Write a complete Pascal program to find how many houses must they paint, for each of them to have one thousand rupees at the end of 4 months?

(**Hint:** *No.of houses = ((no.of persons * 1000) + (no. of months * 152)) / 256*)

Q2.

(i) Determine whether the following statements are true or false.

(a) The REPEAT-UNTIL loop repeats everything that is inside the loop when the condition is false

(b) The WHILE loop always execute the statements in the loop at least once

(c) If there are more than one statement with the IF-THEN or ELSE statements they are not grouped using BEGIN and END

(d) In the CASE statement, selection is done by matching the value of the selector with a case label attached to each statement

(ii) Differentiate between *pass by value* and *pass by variable* parameters in Pascal.

(iii) Explain the difference between a *function* and a *procedure* in Pascal.

(iv) Write a complete Pascal program to read a mark and to print the mark along with the grade. Consider the following grading system.

Mark	**Grade**
0 – 29	E
30 – 39	D
40 – 59	C
60 - 69	B
70 – 100	A

Q3.

(i) Briefly explain the *enumerated data type* and the *record* in Pascal.

(ii) Consider a very simple *customer* billing system and write your own record to represent a customer. The record contains the following members.

- Customer's name
- Address
- Account number
- Balance
- Payment date

(**Hint:** *Payment date has represented as a another record*)

(iii) Define an enumerated data type to store the marital status of a person. Whether they are single, married, divorced, widowed or separated.

PART – B

Q4.

(i) What are the *operators* and *operands* in C? Explain using an example.

(ii) Determine which of the following are valid character constants in C.

(a) 'a' (b) '\n' (c) '\\' (d) 'xyz' (e) '/n'

(iii) A C program contains the following declarations and initial assignments.

```
int i = 18, j = 5;
float x = 0.005, y = -0.01;
```

Determine the value of each of the following expressions. Use the values initially assigned to the variables for each expression.

(a) `(i - 3 *j) % (6 + 2 * 3) / (x - y)`

(b) `-(i + j)`

(c) `++i;`

(d) `i++;`

(e) `-i;`

(iv) Write a complete C program to read a temperature in degrees Fahrenheit and convert it into degrees Celsius, using the formula;

$C = (5/9) * (F - 32)$

Q5.

(i) Write appropriate function declarations (headers) for each of the situation given below.

(a) A function called *sample* returns an integer quantity.

(b) A function called *root* accepts two integer arguments and returns a floating point result.

(c) A function called *convert* accepts a character and returns another character.

(ii) What is meant by *storage classes*?

(iii) Explain in your words the *register storage class* and the *static storage class*.

(iv) What would be the output of the following program segment?

```
#include<stdio.h>

int main()
{
      increment( );
      increment( );
      return 0;
}

increment( )
{
      static int i = 2 ;
      printf ( "%d\n", i ) ;
      i = i + 1 ;
}
```

Q6.

(i) What is a *union*? How does a union differ from a *structure*?

(ii) Define a union of type *student* that contains the following three members.

- Name of the student
- Registration number of the student
- Marks of eight subjects

(iii) What is the primary advantage of using a *file*?

(iv) List down three (03) possible ways in which a file can be opened in C.

(v) What is the purpose of the `fclose` function in C?