

G.R. No.

Paper code - U239-123 (ESE)

**DECEMBER 2019 ENDSEM****S. Y. B.TECH. COMPUTER (SEMESTER (I))****COURSE NAME: PROGRAMMING FOR PROBLEM SOLVING****COURSE CODE: CSUA21183****(PATTERN 2018)**

Time: [2 Hours]

[Max. Marks: 50]

Instructions to candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed.
- 4) Assume suitable data wherever required.

Q.1) Attempt any **one**.

- a) Explain briefly the steps in software development cycle. [4 marks]
- b) Flooring of a room of given length and breadth (in meters) can be done using 2 methods - tiles or matting. Tiles and matting material have different costs per sq. meter. Also, labor charges for flooring, per sq. meter, using tiles is different and from matting. Write two separate equations, using meaningful variable names for calculating the cost of flooring, one for tiling and another for matting. [4 marks]

Q.2) Attempt any **one**.

- a) Draw flowchart for the given decision table for detention policy of college XYZ. [4 marks]

Attendance $\geq 85\%$	T	T	T	T	F	F	F	F
Assignments Complete	T	T	F	F	T	T	F	F
Medical /Event Certificate	T	F	T	F	T	F	T	F
NOC granted	x		x					
Refer to HOD		x			x	x	x	
Detained				x				x

- b) CE marks are calculated by taking best 5 out of six assignments of 100 marks each, and then scaling it down to 50. SE marks are calculated by scaling down to 50 the marks obtained in a 70 marks written exam. The Final Marks add the CE marks and SE marks. The Grade is A, B, C, D respectively for final score in range  $>75$ , 60-74, 50-59 and  $<50$ . Draw a PAC "Processing Required" Column for finding the grade of a student. [4 marks]

Q.3) Attempt any **one**.

- a) Write a 'C' program to accept an array of strings and store their respective lengths in another array [6 marks]
- b) What is exception handling mechanism in C++? Write a program in C++ to handle "divide by zero" exception. [6 marks]

Q.4) Attempt any **one**.

- a) (i) What is logic programming? What is its use and why is it a [4 marks]

declarative programming paradigm.

(ii) Explain the tree structure formed in the process of inferencing goals in logic programming. What is pruning of the tree? Explain the use of "cut" operator in Prolog? [6 marks]

b) (i) Describe the three types of horn clauses and equate them to types of Prolog statements with appropriate examples. [4 marks]

(ii) Explain the terms resolution and unification. Use examples where required. Resolve the following explaining each step. [6 marks]  
fatherof(X,Y) :- parentof(X,Y), male(X).  
parentof(ram, rucha).

Q.5) Attempt any **one**.

a) (i) In brief, describe what is functional programming? Write a recursive LISP function "my-member" without using in-built "member" function to perform the same operation on list. [7 marks]

(ii) Write a lambda expression to print the area of a rectangle, given length and width. Write a LISP function definition for the same task. How is polymorphism displayed in functional programming? [6 marks]

b) (i) Write a single higher order function definition "filter" in LISP using "funcall" which can perform "filter out negatives" in a number list, as well as 2 other functions like filter odds from number list and filter evens from number list. Write a sample of how this filter function will be called and what will be the result of that call. [7 marks]

(ii) Explain any 3 sample LISP operations on lists with examples. [6 marks]

Q.6) Attempt any **one**.

a) (i) What is the value of the expressions? Consider the values of a and b are still 3 and 4, respectively [7 marks]

```
>>>a + 1, a - 1
>>>b * 3, b / 2
>>>a % 2, b ** 2
>>>2 + 4.0, 2.0 ** b
>>>b / 2 + a
>>>b / (2.0 + a)
>>>L = ['spam', 'eggs', 'ham']
>>>L.insert(1, 'toast')
```

(ii) What can a range be used for in a for loop? Write a program to print ABCDE triangle pattern using function. [6 marks]

```
A
B B
C C C
D D D D
E E E E E
```

b) (i) Name two ways to build a list containing five integer zeros. Create List of all days, and print that list in reverse order. (Monday..Sunday) O/P (Sunday..Monday). [7 marks]

(ii) What is Tuple? Write an expression that changes the first item in a tuple. E.g. (4, 5, 6), should become (1, 5, 6) in the process. [6 marks]