

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), Nov.-Dec. 2015

B. Tech in Computer Science Engineering, Semester III

Roll No.....

CSE303: PRINCIPLES OF PROGRAMMING
LANGAUGES

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	Objective type multiple choice questions (10 questions @ 1 mark)	10
i.	What will be the output if you will compile and execute the following c code? #define x 5+2 void main(){ int i; i=x * x * x ; printf("%d",i); } (a) 343 (b) 27 (c) 133 (d) Compiler error	
ii.	char txt [20] = "Hello world!\0"; How many bytes are allocated by the definition above? (a)11 bytes (b)20 bytes (c)13 bytes (d)12 bytes	
iii.	Which one of the following C operator is not a left associative? * (b) , (c) [] (d) ^	
iv.	Which of the following statements is TRUE? (a) Logical operator && and are used in if statement only (b) Comparison operator == and equality operator = are used in if statement (c) Logical and comparison operators are used in both selection and repetition condition (d) None of the above	
v.	What would be the value of z after the following statements are executed?	

```
int z = 5, x = 44;
```

```
if (z > 2)
    switch (x)
    {
        case 45: z += 15; break;
        case 46: z -= 5; break;
        default: z *= 3;
    }
```

(a) 15 (b) 0 (c) 20 (d) 59

- vi What is the use of the continue statement to a while or for loop?
- (a) To continue to the next line of code within the loop
 - (b) To stop the current iteration and exit the loop
 - (c) To ignore the rest of the statements in the loop and move on to the next iteration
 - (d) As an alternative to the else statement

- vii How many times would the printf function be called when the following program segment is executed?

```
int i=12, j=16;

for (; i<j; i++)
{
    if (i%2==1)
        printf("%d\n", i);
}
```

(a) 1 (b) 2 (c) 3 (d) 4

- viii Which one of the following is the correct built-in function to be used to perform this task: "Returns a true value if the value of variable num is a letter, and zero otherwise".

(a) int isletter(int num); (b) int isalpha(int num); (c) int isvowel(int num); (d) int ischar(int num);

- ix Which of the following statements is TRUE? (a) All functions must have formal parameter list; (b) All functions must return a data value; (c) A program must have at least one function; (d) None of the above

- x Which of these is a valid array initialization in C programming?

(a) marks[5] = (55, 33, 86, 81, 67); (b) marks[5] = {55, 33, 86, 81, 67}; (c) marks[5] = {55}, {33}, {86}, {81}, {67}; (d) None of the above

Q.2 Short answer type questions (4 questions @ 2.5 marks)

10

- a. Compare and contrast declaration of pointers in C++ and References in Java.
- b. Give an example of Function Overloading.
- c. Differentiate between free and fixed field format of Language. Give example of

	one language for each category.	
d.	What is the usage of Hypertext Markup Language?	
Q.3A	Which produces faster program execution, a compiler or a pure interpreter? Justify your answer.	05
Q.3B	Write down grammar for Assignment Statement in C Language including preservation for operator precedence and Associativity Rule for addition, Subtraction, Multiplication and Division.	05
Q.4A	Consider the following grammar: $\langle S \rangle \rightarrow a \langle S \rangle c \langle B \rangle \mid \langle A \rangle \mid b$ $\langle A \rangle \rightarrow c \langle A \rangle \mid c$ $\langle B \rangle \rightarrow d \mid \langle A \rangle$ Which of the following sentences are in the language generated by above grammar? abcd, acccbcd, acccbcc, acd, accc	05
Q.4B	Consider the following C program. <pre>int sum(int a){ int x = 0; static int y = 0; if(a==1){ return a; } x = x + sum(a-1); y = y + sum(a-1); cout << x << " " << y << endl; return x+y; } int main() { sum(5); }</pre> What would be the output in following conditions: - y is static integer as shown in program. - y is not a static integer. - sum(1) is called. - sum('a') is called. - Would there be any warning displayed in above program. If yes what and why?	05
Q.5A	Analyze and write a comparison of C's malloc and free functions with C++'s new and delete operators. Use safety as the primary consideration in the	05

	comparison.	
Q.5B	Showcase the use of union in giving example of C program.	05
Q.6A	Differentiate pointer type and reference type. What is a C++ reference type and what is its common use?	05
Q.6B	Define operator precedence and operator associativity. What is the associativity of C's unary arithmetic operators?	05
	OR	
Q.6B	Illustrate the difference between Primitive and Non-primitive data types. List Primitive and Non-primitive data types of C.	05
Q.7A	$\langle \text{assign} \rangle \rightarrow \langle \text{id} \rangle = \langle \text{expr} \rangle$ $\langle \text{id} \rangle \rightarrow A \mid B \mid C$ $\langle \text{expr} \rangle \rightarrow \langle \text{expr} \rangle + \langle \text{term} \rangle \mid \langle \text{term} \rangle$ $\langle \text{term} \rangle \rightarrow \langle \text{term} \rangle * \langle \text{factor} \rangle \mid \langle \text{factor} \rangle$ $\langle \text{factor} \rangle \rightarrow (\langle \text{expr} \rangle) \mid \langle \text{id} \rangle$ Using the above grammar draw a parse tree and also write derivation for the following statement : $A = (A + B) * C$	05
Q.7B	Write a recursive function to calculate Fibonacci series in programming language of your choice.	05
	OR	
Q.7B	Write the following statement in C++/Java. Showcase the output/error/reason of error/type of error (if any) in both the languages. <pre>int i, j, n = 100; for (i = 0, j = 17; i < n; i++, j--) sum += i * j + 3;</pre>	05
Q.8A	Explain the following implementation models of parameter passing with an example of each: (a) Pass-by-Value (b) Pass-by-Result	10
Q.9A	Rewrite the following pseudocode segment using a loop structure in the C/C++/Java languages. <pre>k = (j + 13) / 27 loop: if k > 10 then goto out k = k + 1 i = 3 * k - 1 goto loop out: . . .</pre> Assume all variables are integer type. Discuss which language, for this code, has the best writability, the best readability, and the best combination of the two.	10

Q.9B Below code finds the first row of an n by n integer matrix named x that has nothing but zero values. 10

```
for (i = 1; i <= n; i++) {  
  for (j = 1; j <= n; j++)  
    if (x[i][j] != 0)  
      goto reject;  
  println ('First all-zero row is:', i);  
  break;  
  reject:  
}
```

Rewrite this code without gotos in one of the following languages: C, C++, Java, Compare the readability of your code to that of the example code.

OR

Q.9B Explain if-then-else ambiguity. Whether the following if-statement is ambiguous? Why? Write ambiguous and unambiguous grammar both to parse statements given below. 10

```
IF x > 0  
THEN IF y > 0  
THEN z := x + y  
ELSE z := x;
```

```
if done == true  
then if denom == 0  
then quotient = 0;  
else quotient = num / denom;
```