

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/ Backlog), November 2017

B. Tech in Computer Science and Engineering, Semester: I

Roll No.....

IBM101 : Software Foundation Course with C
Programming

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. Which of the following is not a logical operator?
(A) && (B) != (C) || (D) !
- ii. Which of the following is not a valid declaration in C?
1. short int x;
2. signed short x;
3. short x;
4. unsigned short x;
(A) 3 and 4 (B) 2 (C) 1 (D) All are valid
- iii. Output?

```
int main(){  
    {  
        int var = 10;  
    }  
    {  
        printf("%d", var);  
    }  
    return 0;  
}
```


(A) 10 (B) Compiler Error (C) Garbage Value
- iv. Consider the following variable declarations and definitions in C
i) int var_9 = 1;
ii) int 9_var = 2;
iii) int _ = 3;
Choose the correct statement w.r.t. above variables.
(A) Both i) and iii) are valid. (B) Only i) is valid.
(C) Both i) and ii) are valid. (D) All are valid.
- v. Which of the following statement is correct for switch controlling expression?
(A) Only int can be used in "switch" control expression.
(B) Both int and char can be used in "switch" control expression.
(C) All types i.e. int, char and float can be used in "switch" control expression.
(D) "switch" control expression can be empty as well.

vi. `#include <stdio.h>`

```
int main(){
    int i = 3;
    printf("%d", (++i)++);
    return 0;
}
```

What is the output of the above program?

- (A) 3 (B) 4 (C) 5 (D) Compile-time error

vii. What is the output of the below program?

```
#include <stdio.h>
int main(){
    int i = 0;
    switch (i){
        case '0': printf("IBM");
            break;
        case '1': printf("101");
            break;
        default: printf("IBM101");
    }
    return 0;
}
```

- (A) IBM (B) 101 (C) IBM101 (D) Compile-time error

viii. Assume that float takes 4 bytes, predict the output of following program.

```
#include <stdio.h>
int main(){
    float arr[5] = {12.5, 10.0, 13.5, 90.5, 0.5};
    float *ptr1 = &arr[0];
    float *ptr2 = ptr1 + 3;
    printf("%f ", *ptr2);
    printf("%d", ptr2 - ptr1);
    return 0;
}
```

- (A) 90.500000 3 (B) 90.500000 12 (C) 10.000000 12 (D) 0.500000 3

ix. `struct node {`

`int i;`

`float j;`

`};`

`struct node *s[10];`

The above C declaration define 's' to be -

- (A) An array, each element of which is a pointer to a structure of type node
(B) A structure of 2 fields, each field being a pointer to an array of 10 elements
(C) A structure of 3 fields: an integer, a float, and an array of 10 elements
(D) An array, each element of which is a structure of type node.

x. Which of the following is correct with respect to "Jump Statements" in C?

- (A) goto (B) continue (C) break (D) return (E) All of the above

- Q.2 Write C statement to do the following:
- i.
 - a) Declare and initialise *letter* to be a character variable with the value 'B'. 6
 - b) Declare and initialise *ch* to be a character variable with the value 'y'.
 - c) Declare *ptr* to be a pointer to objects of type *char*.
 - d) Assign the address of *ch* to the variable *ptr*.
 - e) Assign the address of *letter* to the variable *ptr*.
 - f) Change the value of the object pointed to by *ptr* to 'd'.
 - ii.
 - a) Declare a 26-element character array named *fin*. 4
 - b) Declare a character *ch*.
 - c) Read a character into the first element of *fin*.
 - d) Copy that character into every other element of *fin*.
- Q.3A Write a program which reads a single letter of alphabet. If it is a lowercase between 'a' and 'g', the program prints out the alphabet in uppercase form. If it is anything else, the program should print out uppercase 'X'. 05
- Q.3B Write a C program that does the following: 05
- (a) It accepts a sequence of integers from the user, continuing as long as the user enters even integer. Once an odd integer is entered, the program stops accepting input.
 - (b) The program then computes the total number of even integers entered, the sum of them and print those out.
- Q.4A Consider the following C program: 05
- ```
#include <stdio.h>
int main() {
int x[5] = { -4, 9, 12, -3, 7 };
int a, b;
int *p = x+1;
*(p+3)=9;
a = *(x + 3);
b = * (--p);
printf("a=%d b=%d *p=%d x[4]=%d\n",a,b,*p,x[4]);
return 0;
}
```
- What is the output of the program?
- Q.4B Write a C function *vchar* that accepts a character as argument and returns 1 if the character is a vowel and zero otherwise. 05
- Q.5A Rewrite the following code without *while* construct: 05
- ```
int n,s;
n=1;
s=0;
while(n != 49){
    n++;
    s +=n;
    n +=2;
}
```

Q.5B Rewrite the following code without *for* construct:

05

```
int s,i,j;
for(s=0,i=1; i<7; i+=2){
    for(s+=i, j=2*i; j<5; i++, j *=2){
        s +=i;
    }
}
printf("s=%d\n",s);
```

Q.6 Write a C program that reads three integers input representing a date of September as day, month, year. Then it checks the validity of the date entered. Next it prints out the date of the following day.
(Typical input: 28 9 1992 Typical output: Date following 28/9/1992 is 29/9/1992)

OR

Q.6 Construct a structure variable *pt* which represents a point in Cartesian *xy*-plane. Using *pt*, construct a structure variable *tri* which represents a triangle in the *xy*-plane.
Write a C function which accepts a triangle as argument and returns the perimeter of the triangle.

Q.7 Write a C program that accepts a positive integer (from the keyboard) representing a time in seconds. If the input is invalid, it stops after printing the message Invalid input. For a valid input, it then computes and prints out the corresponding value in hours, minutes and seconds. If any component has zero value, then it is not printed (see the examples below).

(Example:

Input	Output
4000	4000 s = 1 h 6 m 40 s.
400	400 s = 6 m 40 s
45	45 s = 45 s
120	120 s = 2 m
3620	3620 s = 1 h 20 s)

OR

Q.7 Write down the output of the following program.

10

```
#include <stdio.h>
void hails(int);
int main()
{
    hails(5);
    return 0;
}
void hails(int n)
{
```

```

printf("%d\n",n);
if (n == 1)
    printf("END\n");
else if (n%2==0)
    hails(n/2);
else
    hails(3*n + 1);
}

```

- Q.8 Write a function to determine whether a year in the Gregorian calendar is a leap year. The function returns integer 1 if it is a leap year else 0. (Hint. A year is a leap year if it is divisible by 4 but not divisible by 100 or divisible by 400.) Using this function write another function to return the number of days in a given month (input in terms of 1-12) and year of the Gregorian calendar. 10
- Q.9A Define a structure that describes a point in a two-dimensional Cartesian plane. Write a C function which takes addresses of two points as its arguments and returns the midpoint of the line segment joining these two points. 10
- Q.9B (A) Write a C Program to find the number of non-repeated elements in an array. 10
(B) Write a C Program to find 2 elements in the array such that difference between them is largest.
- OR
- Q.9B Write a program that accepts the monthly salary as an integer (maximum 5 digits) and produces the output as shown in the example. 10
Example: For input 4012 the output is The monthly salary is Rupees 4 thousand and 12 only. For input 24102 the output is The monthly salary is Rupees 24 thousand 1 hundred and 2 only.