

Time:1 hours Mid Semester Exam-I: MTH409 Full Marks 100

1. Determine which of the following are valid identifiers? If the alleged identifier is not valid, give a short explanation.

- (a) Tom&Jerry (b) H2SO4 (c) OH- (d) myNiceVilla (e) 2Times2Equals4 (f) integer
 (g) \$0.02_Worth (h) "Excelsior" (i) C++_IS_NOT_4_Me! (j) _Underscore_ [5]

2. The following statements are part of a C program in which both the m and n are integers. What are the values of m and n in each of the following?

a. `m=3,n=2;`
`if(m<n){`
`n +=2;`
`if(m>n)`
`m +=2;}` m = _____, n=_____ [2]

b. `m=0,n=0;`
`while(m+n<12){`
`m++;`
`n +=2;}` m = _____, n=_____ [3]

c. `n=5;`
`for(m=1;m<n;m +=3){`
`n +=2;}` m = _____, n=_____ [3]

3. The following is a part of a C program in which p, q are non-negative integers.

```
int r,g;
if(q==0)
  g=p;
else
{
  r = p % q;
  while (r != 0){
    p=q;
    q=r;
    r=p%q;
  }
  g=q;
}
```

What are the values of g when (a) $(p,q)=(2,3)$, (b) $(p,q)=(6,0)$, (c) $(p,q)=(0,9)$, (d) $(p,q)=(6,15)$? Describe the purpose of the code. [8]

4. Study the following statements which are part of a C program. Write down the value of z for (i) $x=2,y=7$, (ii) $x=-5,y=2$ and (iii) $x=-3,y=-3$. Briefly describe the purpose of the code.

```
int x,y,z,d;
printf("Enter two integers:");
scanf("%d%d",&x,&y);
d = x != y ? (x-y)/abs(x-y) : 0;
switch (d) {
case 1:
    z = x;
    break;
case -1:
    z=y;
    break;
default:
    z=x;
}
```

[8]

5. Write a C program which does the following:
- Accepts three integers from the keyboard.
 - Prints out number 1 if any two of them (or all of them) are the same and prints out zero if all of them are different. [5]

6. Write a program that does the following:
- 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.
 - The program must compute the total number of even integers entered and the average of them, and print those out. [7]

7. Following is the Taylor series expansion of $\sin(x)$:

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

Write a C program which accepts a value of x and then calculates the sum upto and including the term with power x^7 . [9]