

9:00-10:00

10/02/2020

(D1/D2)

**Computer Programming with
Applications
(MA 122)**

SC #:
Batch #:

Maximum Marks: **30**

Note:

1. All questions are compulsory.
2. There is no separate answer sheet. Answers are to be written in the question paper itself (in the space provided) and returned. No extra sheets will be provided.
3. Fill in the SC number and batch number in the upper right corner of first page. Also write down your name in the left corner of footnote.
4. Last page of the question paper can be used for rough work.
5. Numbers in right margin indicate the marks for a question.

1. Given

(3)

$$f(x) = \begin{cases} 0.5 & \text{if } x \leq 1 \\ \sin\left(\frac{\pi}{x+1}\right) & \text{otherwise.} \end{cases}$$

for $x \in [0, \infty)$. Write a program that takes x as input and gives $f(x)$ as output. You can **not** use **if-else** statements.

2. Write a program that calculates the *exact* factorial of an integer. Take n as input and output $n!$. Choose the datatype in such a way as to give exact answer for the largest possible n . You are **not** allowed to use any loops (**for**, **while** or **do-while**). (4)

3. Correct the following program. The entire corrected program is expected in the answer. (2)
No need for any write-up to explain the errors.

```
#include <iostream>
short int main(){
    int i="1";
    cout << i << endl;
    return 0;
}
```

4. Each program given below is either compilable or uncompileable. Write down the output if the program is compilable. If the program is compilable, but the output is indeterminate, then mention that. If the program is uncompileable, identify the bug(s) by the line number. Only identify the incorrect line and rectify it. No need to write the entire program. *Write the answer on the right hand side for each question.*

(a)

(3)

```
1 #include <iostream>
2 using namespace std;
3
4 int main(){
5     int i=1, j=2;
6     cout << double(i/j) << endl;
7     cout << (3*i)/j << endl;
8     cout << i/j*3 << endl;
9     cout << 3.0*i/j << endl;
10    cout << (3.0*i)/j << endl;
11    cout << 3.0/j+i/j << endl;
12    return 0;
13 }
```

(b)

(1)

```
1 #include <iostream>
2 using namespace std;
3
4 int main(){
5     int v=2;
6     cout << "v" << endl;
7     return 0;
8 }
```

(c)

(1)

```
1 #include <iostream>
2 using namespace std;
3 int main(){
4     int x, i=2;
5     cout << x << endl;
6     x = i++;
7     cout << x << endl;
8     cout << i << endl;
9     return 0;
10 }
```

(d)

(1)

```
1 #include <iostream>
2 using namespace std;
3
4 int main(){
5     int i = 100000, j = 100000;
6     int k = i*j;
7     cout << k << endl;
8     return 0;
9 }
```

(e)

(1)

```
1 #include <iostream>
2 using namespace std;
3
4 int main(){
5     for(float i=0; i < 2.0; i=i+1)
6         cout << i;
7     return 0;
8 }
```

(f)

(1)

```
1 #include <iostream>
2 using namespace std;
3 int main(){ int j=1;
4 for(int i=0;i<2.0;i++)
5     cout<<i<<endl;cout<<j;
6 return 0;}
```

(g)

(2)

```
1 #include <iostream>
2 using namespace std;
3 int main(){
4     cout << int i=1 << endl;
5     return 0;
6 }
```

(h)

(3)

```
1 #include <iostream>
2 using namespace std;
3 int main(){
4     float a1=1.000000001, a2=1.0000001; int b=1;
5     cout << ((a1 == b)) << endl;
6     cout << (a1 <= b) << endl;
7     cout << (!(a1 == b) && (a1 >= b))/2.0 << endl;
8     cout << ((a2 == b)) << endl;
9     cout << (a2 <= b) << endl;
10    cout << (!(a2 == b) || (a2 >= b))/2.0 << endl;
11    return 0;
12 }
```

(i)

(2)

```
1 #include <iostream>
2 using namespace std;
3
4 int main(){
5     const int i=1;
6     char c = {i};
7     cout << int(c) << endl;
8     return 0;
9 }
```

(j)

(1)

```
1 #include <iostream>
2 int main(){
3     int tmp=5;
4     for (;tmp>2;) {tmp-=1;}
5     std::cout<<tmp<<std::endl;
6     return 0;
7 }
```

(k)

(1)

```
1 #include <iostream>
2 int main(){
3     int i=2;
4     do{
5         std::cout<<i<<std::endl;
6     }while(i<2);
7     return 0;
8 }
```

(l)

(2)

```
1 #include <iostream>
2 int main(){
3     int i, j=10;
4     for(i=j; i<=j; --i){ j=i%3; }
5     std::cout<<i<<"\t"<<j<<"\n";
6     return 0;
7 }
```

(m)

(1)

```
1 #include <iostream>
2 int main(){
3     for(double x : {1,3,4,5,7})
4         if(x%3!=1) std::cout<<x<<std::endl;
5     return 0;
6 }
```

(n)

(1)

```
1 #include <iostream>
2 #include <cmath>
3 #define M_PI 3.14
4 int main(){
5     cout << 2*M_PI << endl;
6     return 0;
7 }
```