

Physics 5 – Midterm Exam II – Spring '11  
Write all responses on separate paper and turn in  
Thursday, May, 19.

1. Is the declaration

```
char * msg = "How"; equivalent to
char * msg = {'H','o','w'\0'}; ?
```

Why or why not?

2. What would be printed by the following statements?

```
#include <iostream>

int f(int &i)
{
    i = 10;
    return(5 * i);
}

int main()
{
    int n = 5;
    f(n);
    cout << *n << "\n";
    return 0;
}
```

3. In #2 above, how does the initialization of  $n = 5$  in `main()` affect the `cout` result? Explain.

4. What would be printed by the following code fragment?

```
int y[3][3] = {1, 2, 3,
              4, 5, 6,
              7, 8, 9};
cout << y[1][2];
```

5. Consider the following code fragment:

```
int x[] = {1,23,17,4,-5,100};
int *p;
p = &x[0]; /*point at first int*/
for(int i = 0; i < 6; i++) {
    cout<<"x[" <<i<<" ]=" <<x[i]<<endl;
    cout<<"p+ " <<i<<" = " <<*(p+i)<<endl;
}
```

- What is produced by this code?
- How would the output change if `x[i]` were replaced by `x[i/2]` and `p+i` were replaced by `p+i/1` ?
- What if `for(int i=0;i<6;i++)` were replaced by `for(int i=0;i<7;i++)`? Explain.

6. What would be printed by the following program?

```
#include <iostream>
using namespace std;
int subl(int &n)
{
    n--;
    return n;
}

int main()
{
    int m = 10;
    for(int j = 0; j < 10; j++)
        m -= subl(j);
    cout << m << "\n";
    return 0;
}
```

7. What would be printed by the following statements?

```
double *pt;
double a[3] = {1.2, 2.3, 3.4};
pt = &a[1];
pt += 1;
cout << *pt << endl;
```

8. What would be printed by the following statements? Why do you think so?

```
int k;
double j;
k = 2;
j = 2.0;
if(k == j){
    cout << "Okay.";
}
else
    cout << "Not okay.";
```

9. Given a program as follows, what would be printed? (assume proper includes, etc.)

```
int myfunc(double);
int myfunc(float);

int main() {
    cout << myfunc(3.51) << "\n";
    return 0;
}

int myfunc(double n) {
    return n * 2.0;
}

int myfunc(float n) {
    return n * 3.0;
}
```

10. Which of the following statements is equivalent to

```
pt->x_center = 10.0; ?
```

- (a) \*pt.x\_center = 10.0;
- (b) (\*pt).x\_center = 10.0;
- (c) (\*pt.)x\_center = 10.0;
- (d) (pt->)x\_center = 10.0;

11. Assuming the assignment operator has been appropriately overloaded, what would be printed by the statements following?

```
class Complex {
public:
    double re, im;
};
```

```
Complex x, y;
```

```
x.re = 4.0;
x.im = 5.0;
```

```
y = x;
x.re = 5.0;
cout << y.re << endl;
```

12. What would be printed by the following program?

```
#include <iostream>

int sum(int pt[], int n)
{
    int temp = 0;
    for (int i = 0; i < n; ++i) {
        temp += pt[i];
    }
    return temp;
}

int main()
{
    int total;
    int pt[5];
    for (int i = 0; i < 5; i++)
        pt[i] = i;
    total = sum(pt, 3);
    cout << total << " " << i << endl;
    return 0;
}
```

13. Which of the following statements contains a reference declarator?

- (a) int \*i;
- (b) swap(&x, &y);
- (c) int x, \*pt; pt = &x;
- (d) int x, &pt = x;
- (e) None of the above.

14. What would be printed by the following statements? Why?

```
double x = !0 * (1 / 3 * 3.0);
cout << x << endl;
```

15. Explain how to dynamically (a) allocate and (b) deallocate a **float** array X[5] by using **new** and **delete** operators.

```
16. int foo(int x)
{
    if(x == 0 || x == 1 || x == 2)
        return x;
    else if( x <= 5)
        return x*x - foo(x - 1);
    else
        return x/2 + foo(x - 1);
}
```

What are the return values for the following function calls? (Hint: trace each function call)

foo(1) \_\_\_\_\_

foo(2) \_\_\_\_\_

foo(3) \_\_\_\_\_

foo(4) \_\_\_\_\_

foo(5) \_\_\_\_\_

foo(6) \_\_\_\_\_

foo(7) \_\_\_\_\_

foo(8) \_\_\_\_\_

foo(9) \_\_\_\_\_

17. Please complete the following program (by filling in lines 2, 6, 17, 24, 27, 28, 38) so that it will read data from the file `test.dat` and print out the data.

```

1  #include <iostream.h>
2  _____
3
4  #define MAX 10
5
6  _____
7  public:
8      char name[25];
9      int Ex1, Ex2;
11 };
11
12 int main()
13 {
14     Student st[MAX];
15     int count = 0;
16
17     _____
18     if (!in)
19     {
20         cout << "Cannot open
21             test.dat.\n";
22         return 1;
23     }
24     _____
25     while(!in.eof())
26     {
27         _____
28         _____
29         cout << st[count].name <<
30             " " << st[count].Ex1 <<
31             " " << st[count].Ex2 <<
32             "\n";
33         count++;
34         if (count >= 10)
35         {
36             cout << "Exceed MAX: "
37                 << MAX << endl;
38             in.close();
39             return(-1);
40         }
41         _____
42     }
43     in.close();
44     return 0;
45 }
```

The input file `test.dat` contains the following data:

```

Eric 77 87
Scott 90 94
Mary 100 100
```

18. Consider the following code.

```

class Nnbr
{
private:
    int _num;
public:
    Nnbr(int n);
    Nnbr();
    int GetNnbr();
    void SetNnbr(int n);
    Nnbr operator =(Nnbr n2);
    Nnbr operator *(Nnbr n2);
};

Nnbr::Nnbr()
{
    _num = 0;
}

Nnbr::Nnbr(int n)
{
    _num = n;
}

int Nnbr::GetNnbr()
{
    return _num;
}

void Nnbr::SetNnbr(int n)
{
    _num = n;
}

Nnbr Nnbr::operator *(Nnbr n2)
{
    return Nnbr(_num * n2._num);
}

Nnbr Nnbr::operator =(Nnbr n2)
{
    m_num = n2.m_num * 2;
    return Nnbr(_num);
}

int main()
{
    Nnbr n1(5), n2(3), n3;
    n3 = n1 * n2;
    cout << n3.GetNnbr() << endl;
    return 0;
}
```

- What is the output of the code?
- What is the default constructor?
- How is the default constructor used in `main()`?
- Modify the code to allow for the division of two `Nnbrs` and such that division by zero returns 1000000.