CS DEPT
MILITARY COLLEGE OF SIGNALS, NUST
FUNDAMENTALS OF PROGRAMMING (FOP)
BESE-16B

Exam:	Midterm	**Instructor:**	Dr. Faisal Bashir
Type of Paper:	Regular	**Total Marks:**	30
Semester:	Fall	**Time Allowed:**	90 mins

Instructions:

1. Attempt all questions
2. Write your Index # on question paper and answer book.
3. Please write neatly and number questions and subparts carefully.
4. If a question is unclear, state your assumptions and answer the problem based on your assumptions.
5. Understanding the question is also a part of the examination.

Q1. Given **[3]**

```
int a = 1, b = 4, c = 6, d = 2, x = 2, y = 3, z = 2 ;
```

Stepwise evaluate the following expressions as True or False.

```
a)   (4 + 5 * a >= b – 4) || (c – 8)
b)    c%x || b == 9/z && (d – 3)
c)      (b < –2) || (a* 3 >= c) && (b > a)
```

Q2. Write Boolean expressions that represent the given English expressions. Assume any variables you use have been declared and initialized. **[2]**

```
a) at least one of x or y is odd
b) t is between 2.3 and 3.3
```

Q3. What is wrong with the following code? (Hint: it is a syntax error.) **[2]**

```
int n;
cin >> n;
if(n > 0) cout << "profit";
else if(n==0)
cout << "break even";
else(n<0)
cout << "negative";
```

Q4. Write the output for the following **[2 x 4 = 8]**

a.

```
int n = 0;
if(!n)
   n = n + 2;
if(n)
   n = -n;
n = n + 2000;
cout<<n;
```

b.

```
int n = 1;
while ( n < 11 )
   if(n%3)
      n = n+2;
   else
      n = n+4;
cout<<n;
```

c.

```
int mark = 85;

if (mark>60)
   cout<<"The grade is D"<<endl;
else if (mark >70)
   cout<<"The grade is C"<<endl;
else if(mark>80)
   cout<<"The grade is B"<<endl;
else if (mark>90)
   cout<<"The grade is A"<<endl;
else
   cout<<"The grade is F"<<endl;
```

d.

```
int y = 0;
switch (y){
   case 0:  y = y + 11;
   case 1:  y = y / 2;
   case 2:  y = y * 5;
   case 3:  y = y + 1;
   default: y = y%3;
}
cout << y << endl;
```

Q5. Transform the following into a `for`-statement to perform the same operation. **[2]**

```
int n;
cout << "Enter n (must be non-negative): ";
cin >> n;
```

```
int loop = 0;
while(loop < n) {
     cout << loop*4 << endl;
     loop += 2;
}
```

Q6. Transform the following into a `do-while`-statement to perform the same operation. **[2]**

```
int n;
cout << "Enter n (must be non-negative): ";
cin >> n;

int loop = 0;
while(loop < n) {
     cout << loop*4 << endl;
     loop += 2;
}
```

Q7. Write the output of the following program. Also, provide values of each variable as it changes. **[4]**

```
#include <iostream.h>
int main(){
  int sum, j;
  for(int i=1; i<=5; i++)
  {   sum = 0;
      j = 1;
      while (j <=i)
      {    sum = sum + j;
           j++;
      }
      cout << sum << ' ';
  }
return 0;
}
```

Q8. Draw a Flow Chart that inputs a number of seconds to calculate the equivalent time in hours, minutes and seconds. For example: 7322 seconds is equivalent to 2 hours 2 minutes 2 seconds. **[3]**

Q9. Faisal just joined a saving plan. It goes like this, on January 1 of every year, he will deposit 10,000 Rs into a saving account. The annual interest rate of the saving account is 5 percent. For example, if he deposits 10,000 Rs on 1/1/2010, then by 31/12/2010, he will have 10500 Rs in the account. On 1/1/2011 he will deposit another 10,000, so he will have 20500 Rs in the account. Then, on 12/31/2011, he will have 21525 Rs in the saving account.

Complete the following program to find out after how many years Faisal will have more than 300,000 Rs in his saving account. **[4]**

```
#include <iostream.h>
int main(){

    double balance =10000;
    int year = 1;

    double interest = 0.05;

//find out how many years does it take for the balance
 //to be more than 300,000

    cout << year << endl;

    return 0;

}
```

Good Luck