Major Exam 01
Thursday, 23 March 2006
Time: 90 minutes

Q. 1: [**3 marks each * 4 = 12 marks**] Give output for each of the following programs in the space provided:

(a)

```
public class Q1
{
  public static void main(String[] args)
  {
    int ctemp = 37, ftemp;
    ftemp = 9*ctemp/5 + 32;
    System.out.println("ftemp = " + ftemp);

  }
}
```

(b) Assume that the user types: **Samir 23 974312**

```
import java.util.Scanner;

public class Q2
{
  public static void main(String[] args)
  {
    int x1;

    String s1, s2, password;

    Scanner keyboard = new Scanner(System.in);

    System.out.println("Enter your first name, age, ID#: ");

    s1 = keyboard.next();
    x1 = keyboard.nextInt();
    s2 = keyboard.next();

    password = s1.substring(0, 2) + (x1 % 7) + s2.charAt(3);

    System.out.println("Your password is: " + password);
  }
}
```

(c) Assume that the user types: **1**

```
import java.util.Scanner;

public class Q3
{
  public static void main(String[] args)
  {
    int c, q;

    Scanner keyboard = new Scanner(System.in);
    System.out.println("Enter an integer from 1 to 3: ");
    c = keyboard.nextInt();
    q = 4 - c;

    switch(q)
    {
      case 1: System.out.println("Hi, welcome to java"); break;

      case 2: System.out.println("c and q are equal!"); break;

      case 3: System.out.println("You typed 1");

      default: System.out.println("Goodbye"); break;
}}}
```

(d)

```
public class Q4
{
  public static void main(String[] args)
  {
    int i, sum = 0;
    double avg;

    for(i = 1; i < 10; i++)
    {
      if(i % 2 == 0) sum = sum + i;
      else sum = sum + 1;
    }

    avg = sum/10.0;
    System.out.println("The sum is: " + sum);
    System.out.println("The average is: " + avg);
}}
```

Q. 2: [**7 marks**] Design and implement a program which inputs from the user the radius of a sphere. It then calculates and prints the surface area of the sphere and its volume using the formulas:

$$A = 4\,\pi\,r^2,\ V = \frac{4}{3}\,\pi\,r^3$$

where A = area, V = volume, r = radius of the sphere
and $\pi = 3.1416$

Q. 3: [**7 marks**] Design and implement a program in Java that calculates the *sum*:

$$sum = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \ldots\ldots\ldots \pm \frac{1}{n}$$

The value of *n* is entered by the user. The program calculates and prints the value of *sum*.

Q. 4: [**12 marks**] Design and implement a program that computes the amount payable by an airline passenger on his baggage based on the following table:

Weight	Amount
≤ 20 kg	SR. 1000
> 20 kg and ≤ 40 kg	SR. 1000 + SR. (100 per kilogram for each additional kilogram exceeding 20 kg).
> 40 kg	SR. 100 per kilogram

The program asks the user to enter the weight of his baggage. The program then outputs the amount payable **.**

Q. 5: [**12 marks**] Write a program that calculates and prints all integers that are composite (*not* prime) between 2 and 10000**.**

(Note: An integer is prime if and only if it is divisible by 1 and itself only.
An integer that is not prime is called *composite.*
For example, 13 is prime since 13 = 1 x 13, but 28 is composite (not prime) since 28 = 2 x 2 x 7.).
