1. **Primitive Data Types and Control Statements**

(a) List Java's eight primitive types, along with the range of each of the integer types. [3]

(b) Java can convert variables between various types.

i. Explain, with examples, the difference between an *implicit typecast* and an *explicit typecast*. [4]

ii. Given the following code, what will the output be and why? [3]

```
public static void main(String args[]) {
    short a = 3450;
    byte b = (byte) a;
    System.out.println(b);
}
```

(c) Program control in Java can be managed using `if` and `switch` statements. Rewrite the following code in the most concise form possible using a `switch` statement. [5]

```
Scanner sinput = new Scanner(System.in);
int c = sinput.nextInt();
if (c == -1) System.out.println("Exiting application");
else if (c == 0) System.out.println(
                "Please enter a number between 1 and 3");
else if (c == 1) System.out.println("Entering mode 1");
else if (c == 2) System.out.println("Entering mode 2");
else if (c == 3) System.out.println("Entering mode 3");
else System.out.println(
                "Please enter a number between 1 and 3");
```

(d) Given the following code,

```
int a = 1, b = 2;
if (a == 1)
    if (b == 3) System.out.println("A is 1 and B is 3");
else
    System.out.println("A is not 1");
```

i. What will the output be, and why? [2]

ii. Rewrite the code using a single `if` statement, and fix any semantic errors. [3]