Part 1 Multiple Choice
30 questions 2 points each.

1. Which is a valid declaration and initialization of a double?

   a) double d = new 2.1;
   b) double d = 2.1f;
   c) double d = "2.1";
   d) double d = 2.1;

2. What is byte code in the context of Java?

   a) The type of code executed by a Java compiler.
   b) The code executed by a Java Virtual Machine
   c) It is another name for a Java source file.
   d) The type of code generated by a Java Virtual Machine.

3. We wish to create a method named subtract that will receive 2 int parameters and return an integer. Which method header is correct?

   a) public static void subtract(int a, int b) {
   b) public static int subtract(int a){
   c) public static int subtract(int a, int b) {
   d) public static int subtract(){

4. We wish to create a method named checkTrue that will receive 2 String parameters and compare them, returning a boolean value. Which method header is correct?
   a) public static void checkTrue(String a, String b){
   b) public static void checkTrue(String a, String b) ;
   c) public static boolean checkTrue(String a) {
   d) public static boolean checkTrue(String a, String b) {

5. Look at the method header. What is the correct way to call this method?

   public static double getResult(int var1, double var2){

   a) double out = getResult(2, 2.5);
   b) double out = getResult(2.3,2.1);
   c) int out = getResult(6,1.11);
   d) double out = getResult{11,4.1};

6. Using the code on the right, what is the value of x?

```
int[] anArray = {221, 100, 201, 10, 99, 7};

int x = anArray[2];
```

a) 10
b) 100
c) 201
d) 221

7. Using the array on the right, what code will return the value 7?

```
int[] anArray = {221, 100, 201, 10, 99, 7};
```

a) int i = anArray[6];
b) int i = anArray[5];
c) int i = anArray[4];
d) int i = anArray[0];

8. How many times will this for loop on run?

```
for(int i = 0; i <= 7; i ++){

  System.out.println("Value is " + i);

}
```

a) 0 times
b) 6 times
c) 7 times
d) 8 times

9. We want the while loop on the right to continue while the two strings are not equal, or b is true. How would you complete the while loop condition?

```
String s = "A String";
String t = "Another String";
Boolean b = false;
while(_____) {
   System.out.println("Display output");
}
```

a) while(!(s.equals(t)) || b == false) {
b) while(!(s.equals(t)) && b = true) {
c) while(!(s==t) || b = true) {
d) while(!(s.equals(t)) || b == true) {

10. Look at the code on the right. What technique is being used in the following code snippet?

```
a = (int) (b * c);
```

a) Conversion
b) Data Structures
c) Casting
d) Encapsulation

```
int a = 0;
double b = 2.5;
double c = 4;
int d = 3;


a = (int) (b * c);
c++;
b = a/c;
d = (int) ((a+3) %b);
```

11. Using the code on the right, after the program has completed, what is the value of a?
    a) 10
    b) 10.0
    c) 0
    d) null

```
int a = 0;
double b = 2.5;
double c = 4;
int d = 3;


a = (int) (b * c);
c++;
b = a/c;
d = (int) ((a+3) %b);
```

12. Using the code above right, after the program has completed, what is the value of b?
    a) 2.0
    b) 10
    c) 0
    d) 2.5

13. Using the code above right, after the program has completed, what is the value of c?
    a) 5.5
    b) 0
    c) 5.0
    d) 4.0

14. Using the code above right, after the program has completed, what is the value of d?
    a) 11.0
    b) 1.0
    c) 11
    d) 1

Look at the following class outline:

```
public class Student extends Person {    (Q. 15)

    private int ID;
    private String name;

    public Student(String name, int age (Q. 16)) {

        super(age); (Q.20)

    } (Q.17)

    public int getId(){}   (Q.18)

    public void setId(int id){}

    public String toString() {} (Q.19)

}
```

15. What Java principle is being demonstrated by the following line of code?

    public class Student extends Person {

    a) Encapsulation
    b) Method Overriding
    c) Parameter Passing
    d) Inheritance

16. What Java principle is being demonstrated by the following line of code?

    public Student(String name, int age)

    a) Encapsulation
    b) Parameter passing
    c) Inheritance
    d) Exception Handling

17. What Java principle is being demonstrated by the following line of code?

```
public Student() {
}
```

a) Exception Handling
b) Constructors
c) Inheritance
d) Encapsulation

18. What Java principle is being demonstrated by the following lines of code?

```
private int Id;

public int getId(){}

public void setId(int id){}
```

a) Exception Handling
b) Parameter Passing
c) Encapsulation
d) Constructors

19. What Java principle is being demonstrated by the following line of code?

```
public String toString() {}
```

a) Encapsulation
b) Parameter Passing
c) Method Overriding
d) Exception Handling

20. What is happening in the following line of code?

```
super(age);
```

a) The constructor of the Student object is being called
b) A new object named age is created
c) The constructor of the Person object is being called
d) The code is checked for errors

21. Where can myVariable be seen/used?
a) Everywhere
b) In this package only
c) In this class only
d) In the constructor method only

```
public class MyClass{
        public int  myVariable;

        public MyClass(){
                myVariable = 2;
        }
}
```

22. Where can myVariable be seen/used?
a) In this package only
b) In the constructor method only
c) In this class only
d) Everywhere

```
public class MyClass{
        private int  myVariable;

        public MyClass(){
                myVariable = 2;
        }
}
```

23. Where can myVariable be seen/used?
    a) In this package only
    b) In the constructor method only
    c) Everywhere
    d) In the class only

```
public class MyClass{
        public MyClass(){
                int myVariable = 2;
        }
}
```

Match the concept with the description:

24. Overriding (B)
25. Inheritance (D)
26. Recursion (A)
27. Static (E)
28. Polymorphism (C)

A. A method can call itself.
B. Changing a method inherited from a parent class
C. Different classes respond in a consistent way to the same method calls.
D. One class extends another, thereby getting all its properties and behaviour.
E. Only one version of a class/variable/method exists, and can be used without creating an instance.

29. What method will be called in this code?
    a) go_nowhere();
    b) fly_kite();
    c) go_coffee();
    d) No method called

```
boolean wind_blowing = true;
int temp = 28;
int money = 55;
if (temp > 25) {
        if(wind_blowing == true) {
                fly_kite();
        }
        else {
                if (money > 30) {
                        go_coffee();
                else {
                        go_cycle();
                }
        }
} else {
        go_nowhere();
}
```

30. What is the correct description for the if statement given below?

```
if(temp<=10 && wind_blowing== true && money>100) {
    go_shopping();
}
```

a) If the temperature is less than 10, and the wind is blowing, and money is greater than 100, then call the go_shopping() method.

b) If the temperature is less than or equal to 10, and the wind is blowing, and money is greater than 100, then call the go_shopping() method.

c) If the temperature is less than or equal to 10, and the wind is not blowing, and money is greater than 100, then call the go_shopping() method.

d) If the temperature is equal to 10, and the wind is not blowing, and money is less than 100, then call the go_shopping() method.

Part 2 Code Completion: 40 points

2 Questions, 20 points each.

Question 1

You have a main class:

```
public class Exam {

  public static void main(String[] args) {

        String[] contents = {"Bottle", "Pen", "Notepad"};
        String brand = "Adidas";
        capacity = 25;
        String colour = "Black"

        Bag schoolbag = new Bag(brand, capacity, colour, contents);
        System.out.println(schoolbag.toString());
  }
}
```

This creates a new Bag object, using the Bag class:

```
public class Bag {

public static void main(String[] args) {

// Instance variables

// Constructor

// Encapsulation

}
```

You should complete the Bag class.

a) Create suitable instance variables, based on the method call in the Exam class. (5 marks)
b) Write a Constructor that will handle the arguments passed in. (5 marks)
c) Encapsulation must be used for all instance variable, with getters and setters. (5 marks)
d) You should override the toString() method, and create your own. (5 marks)

Question 2: 20 points

Given this Java code:

```
public class Exam

    public static void main(String[] args){
        int[] numbers = new int[10];
        fillArrayRandom(numbers);
        System.out.println("Array contents: ")
        printArray(numbers);
        System.out.println("The sum of the numbers is: "+ findSum(numbers));
        printEvenArray(numbers);
    }

    //fill the array with random integers between 0 and 100
    //use Math.random() which gives a double between 0 and 1

    public static void fillArrayRandom(int[] toFill){
    //missing code (a)
    }

    //print the contents of the array to the console, showing the index and value of
    //each element on a new line

    public static void printArray(int[] toPrint){
    //missing code (b)
    }

    //print the content of every index in the array, but only if the value at that index is an
    // even number.  Print each element on a new line

    public static void printEvenArray(int[] toPrint){
    //missing code (c)
    }


    //return the sum of the array
    public static int findSum(int[] array){
    //missing code (d)
    }
}
```

(See next page for further instructions)

Write additional Java code to complete the static methods that are incomplete.
For each method show the method header and complete the missing code:

(a) Code the fillArray method to populate the array with random integers between 0 and 100. (5 marks)

(b) Code the printArray method to print the array contents with each number displayed on a new line. Each array value should be printed on a new line. (5 marks)

(c) Code the printEvenArray method to print only array contents that are an even number. For example, print the integer 22, but do not print the integer 23. (5 marks)

(d) Code the findSum method to produce the sum of all the contents of the array. (5 marks)

END OF FINAL EXAM