

1. Study the algorithm below and answer the following questions:

```
static void print(int n) {  
    if (n > 5) {  
        return;  
    }  
    System.out.println(n);  
    print(n + 1);  
}
```

- a. Describe the above function. (2 marks)
- b. Print the output for the above function. (1 mark)
- c. Discuss what `if (n > 5) return` is doing. (2 marks)

2. What is the factorial of a number (n)? (2 marks)

- a. Give 4, find the $4!$ using the formula: $n! = n * (n-1)!$. (2 marks)
- b. List a difference between a parameter and an argument. (1 mark)

3. Discuss Big O Notation. (1 mark)

- a. Distinguish between time and space complexity. (2 marks)
- b. Using the algorithm:

```
int[] arr = {10, 20, 30, 40};  
for (int num : arr) {  
    System.out.println(num);  
}
```

determine its time complexity. (2 marks).

4. List the differences between a class and an object. (1 marks)

- a. List all the principles of Object Oriented Programming. (2 marks)
- b. List any three types of classes in Java. (1 mark)
- c. Discuss between method-overloading and method-overriding. (1 mark)

5. What are the two types of memory allocation/management in Java? (1 mark)

- a. List a difference between a compile and a run time. (1 mark)
- b. List the two main types of data structures in Java. (1 mark)
- c. List two differences between a stack and a queue. (2 mark)