Question - 1

SCORE: **5 points**

Question 1

How many inversions does the sequence E F J K Y T O R Z W contain?

- 5
- 6
- 7
- 8

Question - 2

SCORE: **5 points**

Question 2

Given an array with reversed order elements, which sort has better Time complexity ?

- Insertion
- Selection
- They both have more or less the same time complexity

Question - 3

SCORE: **5 points**

Question 3

Select the appropriate code that performs selection sort.

a)

```
        int min;
        for(int j=0; j<arr.length-1; j++)
        {
                min = j;
                for(int k=j+1; k<=arr.length-1;
k++)
                {
                        if(arr[k] < arr[min])
                                min = k;
                }
                int temp = arr[min];
                arr[min] = arr[j];
                arr[j] = temp;
        }
```

b)

Help

```
        int min;
        for(int j=0; j<arr.length-1; j++)
        {
                min = j;
                for(int k=j+1; k<=arr.length;
k++)
                {
                        if(arr[k] < arr[min])
                                min = k;
                }
                int temp = arr[min];
                arr[min] = arr[j];
                arr[j] = temp;
        }
```

c)

```
        int min;
        for(int j=0; j<arr.length-1; j++)
        {
                min = j;
                for(int k=j+1; k<=arr.length-1;
k++)
                {
                        if(arr[k] > arr[min])
                                min = k;
                }
                int temp = arr[min];
                arr[min] = arr[j];
                arr[j] = temp;
        }
```

d)

```
        int min;
        for(int j=0; j<arr.length-1; j++)
        {
                min = j;
                for(int k=j+1; k<=arr.length;
k++)
                {
                        if(arr[k] > arr[min])
                                min = k;
                }
                int temp = arr[min];
                arr[min] = arr[j];
                arr[j] = temp;
        }
```

- (●) a
- ( ) b
- ( ) c
- ( ) d

Question - 4

SCORE: **5 points**

Question 4

Regarding Shell sort: given the following list of numbers: [5, 16, 20, 12, 3, 8, 9, 17, 19, 7], which answer illustrates the contents of the list after all swapping is complete for a gap size of 3?

- [ ] [3, 7, 5, 8, 9, 12, 19, 16, 20, 17]
- [x] [5, 3, 8, 7, 16, 19, 9, 17, 20, 12]
- [ ] [5, 16, 20, 3, 8, 12, 9, 17, 20, 7]
- [ ] [3, 5, 7, 8, 9, 12, 16, 17, 19, 20]

Question - 5

SCORE: **30 points**

Sorting

Your task is to implement a student ranking system using insertion sort. Your sort() method should sort students from highest to lowest GPA. You must also implement the higher() method used to compare the students' GPAs.

To Implement the higher() function use the Student class's compareTo() method

Student1 : name="Tina" , id = 1, gpa = 3.0

Student2 : name="Jim" , id =2 , gpa = 3.5

Then **higher(Student1,Student2) should return false**

and **higher(Student2,Student1) should return true**

Both methods to be implemented are in the StudentRank class. There is also a Student class that you should not modify.