## Kotlin Exam

\*\*Instructions:\*\*

- This exam consists of both theory and practice questions.

- The exam duration is 2 hours.

- Answer all the questions.

- For theory questions, provide your answers in the space provided.

- For practice questions, write the code in the space provided.

\*\*Theory Questions:\*\*

1. What is Kotlin? How is it different from Java?

- Your Answer:

2. What are the key features of Kotlin?

- Your Answer:

3. Explain the following terms in Kotlin:

- a. Null Safety:

- b. Data Classes:

- c. Coroutines:

4. What are the primary differences between `val` and `var` in Kotlin?

- Your Answer:

5. Explain the difference between functions and higher-order functions in Kotlin.

- Your Answer:

\*\*Practice Questions:\*\*

1. Write a Kotlin class named `Student` that has the following properties: `name` (String), `age` (Int), `roomNumber` (Int), and `gradeLevel` (Int). Provide a function named `displayInfo()` that prints the student's information.

```kotlin

// Your code here

```

2. Write a Kotlin class named `Room` that has a property named `number` (Int) and a property named `capacity` (Int). Provide a function named `isFull()` that returns true if the room is full (i.e., the number of students in the room is equal to the capacity).

```kotlin

// Your code here

```

3. Write a Kotlin program that creates an instance of the `Room` class and checks if the room is full.

```kotlin

// Your code here

```

4. Create a superclass named `Resident` with a function named `checkIn()` that prints "Resident checked in." Create a subclass named `Student` that inherits from `Resident` and overrides the `checkIn()` function to print "Student checked in." Create an instance of the `Student` class and call the `checkIn()` function.

```kotlin

// Your code here

```

5. Write a Kotlin interface named `Paymentable` with a function named `makePayment()` that calculates and returns the total payment for a dormitory resident. Create a class named `Student` that implements the `Paymentable` interface and provides its own implementation of the `makePayment()` function. Create an instance of the `Student` class and call the `makePayment()` function.

```kotlin

// Your code here

```

6. Write a Kotlin class named `Dormitory` that has a property named `residents` (a list of `Student` objects). Provide a function named `getTotalOccupancy()` that calculates and returns the total number of students in the dormitory.

```kotlin

// Your code here

```

7. Create an instance of the `Dormitory` class and demonstrate the usage of the `getTotalOccupancy()` function.

```kotlin

// Your code here

```

8. Explain the concepts of inheritance and polymorphism in Kotlin.

- Your Answer:

9. What is an abstract class in Kotlin? How does it differ from an interface?

- Your Answer:

10. Explain the concept of encapsulation in OOP and how it is implemented in Kotlin.

- Your Answer:

11. Describe the purpose and usage of the `super` keyword in Kotlin.

- Your Answer:

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