Java model paper

Based on your exam topics—such as classes, objects, inheritance, encapsulation, polymorphism, abstraction, access specifiers, scoping, and keywords like `this`, `super`, `interface`, `extends`, and packages—here are five question papers with a mix of theoretical and practical MCQs, from basic to advanced levels.

Question Paper 1: Basic Concepts in Java

1. **Which of the following is true about objects in Java?**
    - A) They are instances of classes
    - B) They define methods
    - C) They are collections of classes
    - D) They store static members only
2. **What is the purpose of the `this` keyword in Java?**
    - A) Refers to the parent class
    - B) Calls a static method
    - C) Refers to the current object
    - D) None of the above
3. **Which access specifier allows access only within the same package?**
    - A) public
    - B) private
    - C) protected
    - D) default
4. **What is the correct syntax for creating an object of a class `Car` in Java?**
    - A) `Car carObject = new Car();`
    - B) `object Car = new Car();`

- C) `new Car();`
- D) `create Car carObject;`

5. **Which of these statements is true about constructors?**
    - A) They have the same name as the class
    - B) They can have any return type
    - C) They are static methods
    - D) They must have parameters
6. **Encapsulation in Java is achieved by:**
    - A) Inheritance
    - B) Interfaces
    - C) Private data members and public methods
    - D) None of the above
7. **Which of these defines a class in Java?**
    - A) `Class MyClass {}`
    - B) `class MyClass {}`
    - C) `public class MyClass() {}`
    - D) `create class MyClass {}`
8. **What is the output of the following code?**

    ```
    int x = 5;
    System.out.println(++x);
    ```

    - A) 5
    - B) 6
    - C) 4
    - D) Compiler Error
9. **The `extends` keyword is used for:**

    - A) Defining packages
    - B) Implementing interfaces
    - C) Inheritance
    - D) Overloading methods

10. **Which of the following data types is not a primitive type in Java?**
    - A) int
    - B) float
    - C) String
    - D) double

Question Paper 2: Object-Oriented Concepts

1. **What is inheritance in Java?**
    - A) A process by which one class acquires properties of another class
    - B) A way of overloading methods
    - C) The use of multiple constructors
    - D) A method to manage access to data
2. **Which keyword is used to call the superclass's constructor?**
    - A) this
    - B) super
    - C) extends
    - D) base
3. **Polymorphism allows:**
    - A) The same method to perform different tasks
    - B) Multiple inheritance
    - C) Private data access
    - D) Data hiding

4. **Which of these is true about abstract classes?**
    - A) They can be instantiated
    - B) They can contain concrete methods
    - C) They cannot have constructors
    - D) They can only contain abstract methods
5. **The purpose of encapsulation is to:**
    - A) Restrict data access
    - B) Allow inheritance
    - C) Facilitate polymorphism
    - D) None of the above
6. **Given the following code, what will be the output?**

```
public class Test {
    public static void main(String[] args) {
        Parent obj = new Child();
        obj.display();
    }
}

class Parent {
    void display() {
        System.out.println("Parent");
    }
}

class Child extends Parent {
    void display() {
        System.out.println("Child");
    }
}
```

- A) Parent
- B) Child
- C) Compilation Error
- D) None of the above

7. **Which access specifier allows access to a method only within its class?**
    - A) protected
    - B) public
    - C) private
    - D) default

8. **What will the following code print?**

    ```
    int x = 10;
    System.out.println(x++);
    ```

    - A) 10
    - B) 11
    - C) 9
    - D) Compilation Error

9. **An interface in Java:**
    - A) Can contain only abstract methods
    - B) Can have private methods
    - C) Can be instantiated
    - D) Has a constructor

10. **The `super` keyword is used to:**
    - A) Refer to the child class
    - B) Refer to the immediate parent class
    - C) Access static variables

- D) Implement multiple inheritance

Question Paper 3: Advanced Concepts

1. **What is the correct way to declare a method in an interface?**
    - A) `void display();`
    - B) `public void display();`
    - C) `abstract void display();`
    - D) `default void display();`
2. **In Java, multiple inheritance is achieved through:**
    - A) Classes
    - B) Interfaces
    - C) Packages
    - D) None of the above
3. **Which of the following is true about Java packages?**
    - A) They are used to define interfaces
    - B) They help avoid name conflicts
    - C) They cannot be imported
    - D) They are required for every Java program
4. **What will the following code output?**

```
class A {
    int i = 10;
}
class B extends A {
    int i = 20;
    void show() {
        System.out.println(super.i);
    }
}
```

- A) 10
- B) 20
- C) Compilation error
- D) 30

5. **What is true about `static` keyword in Java?**

    - A) It allows method overriding
    - B) It can be applied to local variables
    - C) Static methods cannot access instance variables directly
    - D) Static variables are non-shareable across instances

6. **A class implementing multiple interfaces must:**

    - A) Provide implementation for all methods in each interface
    - B) Implement methods of the first interface only
    - C) Override all inherited methods
    - D) None of the above

7. **The purpose of an abstract class is:**

    - A) To prevent instantiation
    - B) To allow multiple inheritance
    - C) To enable private inheritance
    - D) None of the above

8. **Which of the following defines an array of 5 integers in Java?**

    - A) `int[] arr = new int[5];`
    - B) `int arr = [5];`
    - C) `int arr[5] = new int[];`

- D) `int[5] arr = new int[];`

9. **If a class is declared as `final`, then:**
    - A) It can be subclassed
    - B) It cannot be subclassed
    - C) It can only be accessed by classes within the same package
    - D) It can only contain static methods
10. **What is true about packages in Java?**
    - A) A package is a single file
    - B) Packages help prevent naming conflicts
    - C) Packages cannot contain other packages
    - D) Packages must have the same name as the class

Question Paper 4: Intermediate to Advanced Object-Oriented Programming

1. **What will be the output of the following code?**

```
public class Test {
    public static void main(String[] args) {
        int a = 10, b = 20;
        System.out.println(a > b ? a : b);
    }
}
```

    - A) 10
    - B) 20
    - C) Compilation error
    - D) None of the above
2. **Which of these statements about Java interfaces is true?**

- A) Interfaces can have instance variables
- B) Interfaces can have static and default methods
- C) Methods in an interface are private by default
- D) Interfaces cannot extend other interfaces

3. **What is method overloading in Java?**
    - A) Using the same method name but different return types
    - B) Using the same method name with different parameters
    - C) Overriding a method in a subclass
    - D) Using static methods only
4. **What will the following code output?**

    ```
    class Test {
        public static void main(String[] args) {
            int a = 5, b = 10;
            System.out.println("Sum is: " + a + b);
        }
    }
    ```

    - A) Sum is: 15
    - B) Sum is: 510
    - C) Sum is: 5 + 10
    - D) Compilation error
5. **Which keyword is used to restrict a method from being overridden?**
    - A) final
    - B) static
    - C) const
    - D) private
6. **Which of the following is an example of encapsulation?**

- A) Declaring instance variables as `private` and providing `public` getters/setters
- B) Extending a class
- C) Using the `super` keyword
- D) Creating an abstract class

7. **What will be the output of the following code?**

```
class Parent {
    void show() {
        System.out.println("Parent");
    }
}

class Child extends Parent {
    void show() {
        System.out.println("Child");
    }
}

public class Test {
    public static void main(String[] args) {
        Parent p = new Child();
        p.show();
    }
}
```

- A) Parent
- B) Child
- C) Compilation error
- D) None of the above

8. **Which of these best describes the concept of polymorphism?**

- A) Having many methods with the same name but different signatures

- B) Implementing multiple inheritance
- C) Hiding data members
- D) Using private variables

9. **What will be the output of the following code?**

```
int[] arr = {1, 2, 3, 4, 5};
System.out.println(arr[2]);
```

- A) 1
- B) 2
- C) 3
- D) Compilation error

10. **What is the correct way to declare an interface in Java?**

- A) `interface MyInterface {}`
- B) `public interface MyInterface {}`
- C) Both A and B
- D) `class MyInterface {}`

Question Paper 5: Advanced Java Programming and Keywords

1. **What is the primary purpose of the `this` keyword in Java?**

- A) To call the superclass's constructor
- B) To refer to the current instance of a class
- C) To invoke a static method
- D) To indicate a package-level variable

2. **In Java, which access modifier makes a class member accessible only within its own class?**

- A) protected
- B) public

- C) private
- D) default

3. **Which of the following is NOT a feature of the `static` keyword?**
   - A) Static methods cannot access instance variables directly
   - B) Static variables are shared among all instances of a class
   - C) Static methods can be overridden
   - D) Static methods belong to the class, not to any specific instance
4. **Given the code snippet, what is the output?**

   ```
   int[] numbers = {1, 2, 3, 4};
   System.out.println(numbers.length);
   ```

   - A) 3
   - B) 4
   - C) 5
   - D) Compilation error
5. **If a method in a subclass has the same name and parameters as a method in the superclass, this is called:**
   - A) Overloading
   - B) Inheritance
   - C) Overriding
   - D) Encapsulation
6. **What is true about the `final` keyword when applied to a class?**
   - A) It allows other classes to extend it
   - B) It restricts the class from being subclassed
   - C) It can be modified within the subclass
   - D) None of the above

7. **Which of these statements about abstract methods is correct?**
    - A) Abstract methods must be private
    - B) Abstract methods cannot have a body
    - C) Abstract methods can be static
    - D) Abstract methods can be final
8. **In Java, `package` is used for:**
    - A) Grouping related classes and interfaces
    - B) Defining access modifiers
    - C) Overriding methods
    - D) Defining static variables
9. **What will be the output of the following code?**

    ```
    int a = 10;
    int b = 5;
    System.out.println(a / b + a * b);
    ```

    - A) 15
    - B) 55
    - C) 51
    - D) Compilation error
10. **Which of the following best describes the `extends` keyword?**
    - A) It creates an interface
    - B) It is used for inheritance between classes
    - C) It creates a new class
    - D) It declares a new variable

Question Paper 1: List, Set, and Map Interfaces

1. **Which of the following interfaces does NOT allow duplicate elements?**
    - A) List
    - B) Set
    - C) Map
    - D) Collection
2. **Which method is used to get the number of elements in a Collection?**
    - A) `size()`
    - B) `count()`
    - C) `length()`
    - D) `capacity()`
3. **Which of these classes implements the List interface?**
    - A) HashMap
    - B) LinkedList
    - C) TreeSet
    - D) HashSet
4. **What does the `get()` method of a Map return if the specified key does not exist?**
    - A) 0
    - B) An exception
    - C) null
    - D) An empty string
5. **Which of the following is true about the Set interface?**
    - A) It allows duplicate elements
    - B) It has predictable iteration order
    - C) It extends the List interface
    - D) It does not allow duplicate elements

6. **In which scenario would you prefer using a LinkedList over an ArrayList?**
    - A) When you need fast random access
    - B) When frequent insertions and deletions at both ends are required
    - C) When searching through elements is a priority
    - D) When memory usage needs to be minimal
7. **What will be the output of the following code?**

    ```
    List<String> list = new ArrayList<>();
    list.add("A");
    list.add("B");
    list.add("A");
    System.out.println(list.size());
    ```

    - A) 1
    - B) 2
    - C) 3
    - D) Compilation error
8. **Which of these allows both key-value mapping and does not maintain insertion order?**
    - A) HashSet
    - B) HashMap
    - C) TreeMap
    - D) LinkedHashMap
9. **Which method is used to add an element to a Set?**
    - A) `put()`
    - B) `insert()`
    - C) `add()`
    - D) `append()`

10. **Which of these can contain duplicate keys?**
    - A) TreeMap
    - B) HashMap
    - C) LinkedHashMap
    - D) None of the above

Question Paper 2: ArrayList, LinkedList, HashSet, and HashMap

1. **Which of the following statements about ArrayList is true?**
    - A) ArrayList is synchronized
    - B) ArrayList allows random access
    - C) ArrayList has a fixed size
    - D) ArrayList is implemented using a doubly linked list
2. **What is the time complexity for accessing an element in a LinkedList?**
    - A) O(1)
    - B) O(log n)
    - C) O(n)
    - D) O(n^2)
3. **Which of these classes is suitable for a collection with unique elements and no ordering requirement?**
    - A) ArrayList
    - B) LinkedList
    - C) HashSet
    - D) Vector
4. **How do you retrieve a value from a HashMap given a key?**
    - A) `map.getKey()`
    - B) `map.retrieve(key)`

- C) `map.get(key)`
- D) `map.find(key)`

5. **What is the initial capacity of an Array List if no capacity is specified?**
    - A) 5
    - B) 10
    - C) 15
    - D) 20
6. **Which of the following statements is true about a HashSet?**
    - A) HashSet maintains insertion order
    - B) HashSet allows duplicate elements
    - C) HashSet is ordered based on natural ordering
    - D) HashSet does not allow duplicate elements
7. **What will the following code output?**

    ```
    Map<String, Integer> map = new HashMap<>();
    map.put("A", 1);
    map.put("B", 2);
    map.put("A", 3);
    System.out.println(map.get("A"));
    ```

    - A) 1
    - B) 2
    - C) 3
    - D) Compilation error
8. **Which of the following allows duplicates and maintains insertion order?**
    - A) HashSet
    - B) LinkedHashSet
    - C) LinkedList

- D) TreeSet

9. **What will the following code output?**

```
List<Integer> list = new LinkedList<>();
list.add(1);
list.add(2);
list.add(3);
list.remove(1);
System.out.println(list);
```

   - A) [1, 2, 3]
   - B) [2, 3]
   - C) [1, 3]
   - D) [3]

10. **What method would you use to check if a HashMap contains a particular key?**

    - A) `contains()`
    - B) `containsKey()`
    - C) `hasKey()`
    - D) `checkKey()`

Question Paper 3: Iterators and Iteration

1. **Which method of the Iterator interface removes the last element returned by the iterator?**

   - A) `remove()`
   - B) `delete()`
   - C) `clear()`
   - D) `dispose()`

2. **Which of the following is NOT an iterator type in Java?**

- A) Iterator
- B) ListIterator
- C) SetIterator
- D) Spliterator

3. **What will the following code output?**

```
List<String> list = new ArrayList<>();
list.add("A");
list.add("B");
Iterator<String> iterator = list.iterator();
while (iterator.hasNext()) {
    System.out.print(iterator.next() + " ");
}
```

   - A) A B
   - B) B A
   - C) A B A B
   - D) Compilation error

4. **What is the purpose of the `forEachRemaining()` method in an iterator?**
   - A) To iterate over each element
   - B) To print elements
   - C) To apply an action to remaining elements
   - D) To reset the iterator

5. **Which method is specific to ListIterator but not to a basic Iterator?**
   - A) `hasNext()`
   - B) `next()`
   - C) `hasPrevious()`
   - D) `remove()`

6. **What will happen if `iterator.remove()` is called before `iterator.next()`?**
    - A) Removes the first element
    - B) Throws `IllegalStateException`
    - C) Does nothing
    - D) Removes the last element
7. **Which of the following is a characteristic of fail-fast iterators?**
    - A) They allow concurrent modifications
    - B) They throw `ConcurrentModificationException` on structural changes
    - C) They continue iterating after modification
    - D) They are thread-safe
8. **Which method is NOT part of the ListIterator interface?**
    - A) `previous()`
    - B) `add()`
    - C) `nextIndex()`
    - D) `removeAll()`
9. **Which method of Iterator advances the iterator to the next element and returns it?**
    - A) `next()`
    - B) `hasNext()`
    - C) `previous()`
    - D) `peek()`
10. **Which iterator type supports both forward and backward traversal?**
    - A) Iterator
    - B) ListIterator
    - C) Spliterator
    - D) TreeIterator

Question Paper 4: Sorting and Searching with Comparator and Comparable

1. **Which method in the `Comparator` interface is used for comparison?**

    - A) `compareTo()`
    - B) `compare()`
    - C) `equals()`
    - D) `compareWith()`

2. **What will the following code output?**

    ```
    List<Integer> numbers = Arrays.asList(3, 1, 2);
    Collections.sort(numbers);
    System.out.println(numbers);
    ```

    - A) [1, 2, 3]
    - B) [3, 2, 1]
    - C) [1, 3, 2]
    - D) Compilation error

3. **Which of these can be used to sort a list of objects in a custom order?**

    - A) Comparable
    - B) Comparator
    - C) Cloneable
    - D) Iterable

1. **What will the following code output if the `Book` class implements `Comparable` by sorting based on price?**

    ```
    List<Book> books = new ArrayList<>();
    books.add(new Book("Java", 500));
    ```

```
books.add(new Book("Python", 400));
Collections.sort(books);
for (Book b : books) {
    System.out.println(b.getTitle());
}
```

- A) Python Java
- B) Java Python
- C) Compilation error
- D) Runtime error

2. **If a class implements `Comparable`, which method must it define?**
    - A) `compareTo()`
    - B) `compare()`
    - C) `equals()`
    - D) `hashCode()`
3. **Which of these statements is true about `Comparator`?**
    - A) It allows sorting objects of classes that do not implement `Comparable`
    - B) It cannot be used with `Collections.sort()`
    - C) It can only be used with classes that implement `Comparable`
    - D) It sorts elements in natural order by default
4. **Which of these methods is used to search for an element in a sorted list?**
    - A) `linearSearch()`
    - B) `binarySearch()`
    - C) `search()`
    - D) `find()`
5. **If a class implements both `Comparable` and `Comparator`, which one takes precedence in sorting when used with `Collections.sort()`?**

- A) Comparable
- B) Comparator
- C) Neither
- D) Depends on the JVM

6. **What does the following code do?**

```
List<Integer> list = Arrays.asList(4, 2, 3);
Collections.sort(list, Collections.reverseOrder());
System.out.println(list);
```

- A) Prints `[2, 3, 4]`
- B) Prints `[4, 3, 2]`
- C) Prints `[3, 4, 2]`
- D) Compilation error

7. **Which of the following methods will you use to sort a list with a custom comparator?**

- A) `Collections.sort(list, comparator)`
- B) `Arrays.sort(list, comparator)`
- C) `list.sort(comparator)`
- D) Both A and C

Question Paper 5: Exception Handling in Collection Framework

1. **What exception is thrown if a nonexistent key is accessed in a `HashMap` using `get()`?**

- A) `NoSuchElementException`
- B) `NullPointerException`
- C) `IndexOutOfBoundsException`
- D) None (returns `null`)

2. **Which exception is thrown when there is concurrent modification of a collection?**

    - A) `ConcurrentModificationException`
    - B) `IllegalStateException`
    - C) `IndexOutOfBoundsException`
    - D) `NullPointerException`

3. **What will be the result of the following code?**

    ```
    List<Integer> list = new ArrayList<>(Arrays.asList(1, 2,
    3));
    for (Integer i : list) {
        if (i == 2) list.remove(i);
    }
    ```

    - A) [1, 3]
    - B) [1, 2, 3]
    - C) Throws `ConcurrentModificationException`
    - D) None of the above

4. **Which statement about exception handling in iterators is true?**

    - A) `Iterator` methods throw `ConcurrentModificationException` if the collection is structurally modified
    - B) `Iterator` methods can continue after modification
    - C) `Iterator` methods only throw checked exceptions
    - D) Iterators are thread-safe by default

5. **How do you handle `ConcurrentModificationException` when iterating over a collection?**

    - A) Use a synchronized block
    - B) Use `CopyOnWriteArrayList` or `ConcurrentHashMap`
    - C) Use a try-catch block around the iteration

- D) None of the above

6. **Which of these will be thrown if an invalid index is accessed in an `ArrayList`?**
    - A) `ArrayIndexOutOfBoundsException`
    - B) `IndexOutOfBoundsException`
    - C) `ConcurrentModificationException`
    - D) `NoSuchElementException`

7. **What does the following code output?**

    ```
    try {
        List<Integer> list = Arrays.asList(1, 2, 3);
        list.add(4);
    } catch (Exception e) {
        System.out.println(e.getClass().getName());
    }
    ```

    - A) `java.lang.IndexOutOfBoundsException`
    - B) `java.lang.UnsupportedOperationException`
    - C) `java.lang.IllegalArgumentException`
    - D) `java.lang.NoSuchElementException`

8. **Which exception is thrown when an attempt is made to insert a `null` key into a `TreeMap`?**
    - A) `NullPointerException`
    - B) `ClassCastException`
    - C) `IllegalStateException`
    - D) `NoSuchElementException`

9. **What does the following code output?**

    ```
    Map<String, Integer> map = new HashMap<>();
    map.put(null, 1);
    ```

```
System.out.println(map.get(null));
```

- A) 1
- B) 0
- C) null
- D) Throws `NullPointerException`

10. **Which of these can help avoid exceptions related to concurrent modification in a multi-threaded environment?**

    - A) `SynchronizedMap`
    - B) `ConcurrentHashMap`
    - C) `Collections.synchronizedList(new ArrayList<>())`
    - D) All of the above