

8 Object-Oriented Programming with Java (RKH)

- (a) Write an immutable Java class `Complex` that represents a complex number with integer real and imaginary components. [*Note:* Your class should contain only methods that are essential for its use. Do not incorporate any mathematical operations in the class.] [4 marks]
- (b) Without using Generics, adapt the class to support the use of arbitrary types to store the real and imaginary components. Give three disadvantages of this approach and comment on the immutability of the new class. [7 marks]
- (c) Rewrite your class from part (b) using Generics. Discuss the extent to which this new version addresses the problems identified in part (b). [7 marks]
- (d) Explain carefully why the following code cannot be used to print out an object of type `LinkedList<Complex<Double>>`. You may assume the existence of a working `print` method within each `Complex` object.

```
void printAll(LinkedList<Complex<Object>> list) {
    for (Complex<Object> c : list)
        c.print();
}
```

[2 marks]