1. In object-oriented programming, what is meant by the following terms?

(a) Encapsulation [2]

Encapsulation is grouping data to one place, like one class

(b) Data hiding [2]

Data hiding also groups data to one area, for example the same class, but prevents certain things in the class from accessing it

(c) Instantiation [2]

Declaration of an instance

(d) Inheritance [2]

The ability to access the parent class’s attributes and methods etc. For example an object of a subclass inherits it’s parent’s class’ attributes and methods and everything else the parent class has, meaning the child object can use it all too, except an inherited object you can also redefine certain instances, like if you want to redefine a method that was inherited

(e) Polymorphism [2]

Ability to have objects of different classes be treated in the same way

2. An object-oriented program is to be used to store and display details of members of a sports club.

A member class is defined which holds attributes surname, first name, annual membership fee, and methods to amend and display these details.

A junior member class inherits the attributes and methods of the member class but has an additional attribute date of birth.

An incomplete definition of the Member class is given below.

Complete the statements where indicated. [3]

class Member

private surname

private firstname

private annualFee

public procedure new(mySurname, myFirstName, myAnnualFee)

surname = mySurname

firstname = myFirstName

annualFee = myAnnualFee

endprocedure

public procedure amendDetails(mySurname, myfirstname, myAnnualFee)

*(leave this procedure incomplete)*

endprocedure

*(other procedures – do not complete)*

endclass

(a) Complete the definition of the JuniorMember class constructor. [2]

class JuniorMember

private dateOfBirth

public procedure new(mySurname, myFirstname, myAnnualFee, myDateOfBirth)

surname = mySurname

firstname= myFirstname

annualFee = myAnnualFee

dob= myDateOfBirth

endprocedure

*(other procedures – do not complete)*

endclass

(b) Write a statement to instantiate a junior member called Harry Mason, born 12/12/2004, annual fee £25.00. [1]

harry = JuniorMember(Mason, Harry, 25.00, 12/12/2024)

(c) Write a method which will amend the annual fee of a junior member. [2]

public procedure amendAnnualFee(newAnnualFee)

annualFee = newAnnualFee

endprocedure

(d) Write a method which will return the date of birth of a junior member. [2]

public procedure getDob()

return dob

endprocedure

[Total 20 marks]