



12.1 Functional programming paradigm

Name: _____

Class: _____

Date: _____

Time: **20 minutes**

Marks: **14 marks**

Comments:

Q1.

In a functional programming language a function named `square` and three lists `a`, `b` and `c` are defined as follows.

```
square x = x * x
```

```
a = [1, 3, 5]
```

```
b = [1, 5, 10, 15]
```

```
c = [9, 7, 2]
```

- (a) What is the list or value that is the result of applying the functions `head(tail(tail b))`?

(1)

- (b) Calculate the results of making the function calls listed in **Table 1** with the lists `a`, `b` and `c` above.

Table 1

Function Call	Result
<code>map square a</code>	
<code>filter (<10) b</code>	
<code>fold (+) 0 c</code>	

(3)

- (c) `map` is an example of a higher-order function.

Explain what a higher-order function is.

EXAM PAPERS PRACTICE

(1)

(Total 5 marks)

Q2.

In a functional programming language, a recursively defined function named `map` and a function named `double` are defined as follows:

```
map f [] = []
```

```
map f (x:xs) = f x : map f xs
```

```
double x = 2 * x
```

The function `x` has two parameters, a function `f`, and a list that is either empty (indicated

as `[]`), or non-empty, in which case it is expressed as `(x:xs)` in which `x` is the head and `xs` is the tail, which is itself a list.

- (a) In **Table 1**, write the value(s) that are the head and tail of the list `[1, 2, 3, 4]`.

Table 1

Head	
Tail	

- (b) The result of making the function call `double 3` is 6.

(1)

Calculate the result of making the function call listed in **Table 2**.

Table 2

Function Call	Result
<code>map double [1, 2, 3, 4]</code>	

(1)

- (c) Explain how you arrived at your answer to part (b) and the recursive steps that you followed.

(3)

(Total 5 marks)

Q3.

- (a) Put **one** tick on each row of the table below to classify each of (i), (ii) and (iii) as either a URL, a Domain Name, an IP address or a Protocol.

		URL	Domain Name	IP Address	Protocol
(i)	<code>http://www.guineas.co.uk</code>				

(ii)	212.58.251.195				
(iii)	guineas.co.uk				

(3)

(b) What is the purpose of a Domain Name Server on the Internet?

(1)

(Total 4 marks)

