

12.1 Functional programming paradigm		Name:	
		Class:	
		Date:	
Time:	20 minutes		
Marks:	14 marks		
Comments:			

Q1.

In a functional programming language a function named $\tt square$ and three lists <code>a, b</code> and <code>c</code> are defined as follows.

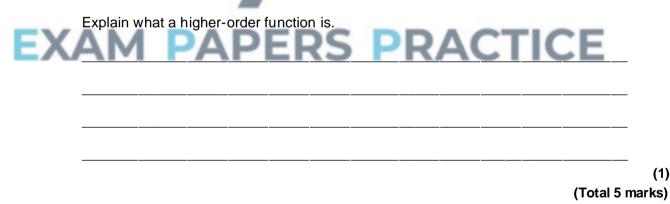
```
square x = x * x
a = [1, 3, 5]
b = [1, 5, 10, 15]
c = [9, 7, 2]
```

- (a) What is the list or value that is the result of applying the functions head(tail(tail b))?
- (b) Calculate the results of making the function calls listed in Table 1 with the lists <code>a, b</code> and <code>c</code> above.

Table 1

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

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



Q2.

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

 $\begin{array}{rcl} map & f & [] & = & [] \\ map & f & (x:xs) & = & f & x & : & map & f & xs \\ \mbox{double} & x & & = & 2 & * & x \end{array}$

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

(1)

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].

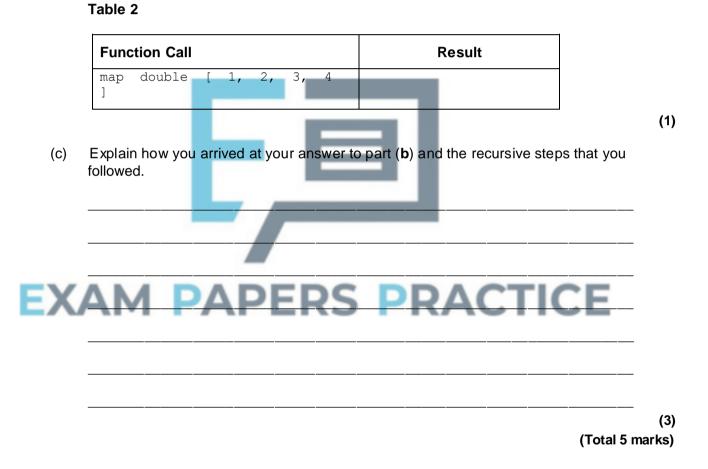
Table 1

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**.



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)	http://www.guineas.co. uk				

(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)

