12.1 Functional programming paradigm Mark Scheme

Q1.

(a) **Marks is for AO2 (apply)**

`10;`
A. `[10]` this time

1

(b) **Mark is for AO2 (apply)**

Function Call	Result
`map square a`	`[1,9,25]`
`filter (<10) b`	`[1,5]`
`fold (+) 0 c`	`18`

1 mark for each correct response in the **Result** column.
I. Missing brackets this time or use of incorrect type of brackets
I. If returned values are assigned to new lists eg `x = [1,9,25]`
A. [5,1] for row 2 this time

3

(c) **Mark is for AO1 (knowledge)**

A function that takes a function as an argument // returns a function as a result // takes a function as an argument and returns a function as a result;
A. "Parameter", "Input" for "Argument"
NE. A function that uses another function
R. Explanations that are specifically of the map function

1

[5]

EXAM PAPERS PRACTICE

Q2.

(a) **Marks is for AO1 (understanding)**

Head	1
Tall	[2,3,4]

1 mark for both head and tail correct.
I if brackets are missing in tail.

1

(b) **Mark is for AO2 (apply)**

[2, 4, 6, 8];

I if brackets are missing in tail.

1

(c) **All marks AO1 (understanding)**

1 mark: Explaining that map applies the function double to each list element;
1 mark: Explaining that map applies double to the head of the list;
1 mark: and then a recursive call is made on the tail of the list;

3

[5]

Q3.

(a)

	URL	Domain Name	IP Address	Protocol
(i) http://www.guineas.co.uk	✔			
(ii) 212.58.251.195			✔	
(iii) guineas.co.uk		✔		

1 mark for each correctly placed tick

R Answers with more than one tick on a row.

3

(b) To translate/convert/resolve domain names into IP addresses;
A FQDN for domain name
Answer must have the CONCEPT of an action
NE To store the domain names and IP Addresses
NE To access the web page without knowing the IP address
NE To link the domain name to the IP address

1

[4]

EXAM PAPERS PRACTICE

Examiner reports

Q1.

(a) This question was moderately well answered with just over half of students correctly identifying that the result of applying the functions was 10. Some students gave the result as [10], which was accepted this year. Students should be aware however that, when the output of the head function should be a single value, we will not accept answers expressed as lists in the future. The most common incorrect response was 15.

(b) The purposes of the `map` and `filter` functions were fairly well understood with two thirds of students achieving two or more of the three marks, but the purpose of the `fold` function was less well known. The most common incorrect response with regard to filter was [10, 15] which suggested that students had either confused < and > or that they believed the `filter` function filtered numbers out of the result rather than filtering them into it. `fold` was poorly understood. Many students either gave the original list as the output or simply appended the 0 to the original list to generate the output. Marks were only awarded for `fold` if the result was expressed as a single value rather than a list containing a single value as the fundamental purpose of this application of the fold operation was to combine the list into one single value.

(c) The term “higher-order” function was not well understood with only just over a quarter of students correctly identifying that a higher-order function would take another function as an argument or return a function as a result. Responses that a higher-order function would use other functions were not considered mark worthy as this description could be applied to many functions. Other common mistakes were to believe that a higher-order function was simply more important than some other functions or to confuse one with a built-in function in a procedural language.

Q3.

Part (a) was very successfully answered. The vast majority of candidates could distinguish between an IP address, Domain Name and URL and gained full marks. Only a handful of candidates failed to score any marks.

For part (b) many candidates had some idea what a Domain Name Server (DNS) did but often described this poorly. The majority simply stated that it stored the appropriate URL and IP address combinations and left it at that, they did not go on to mention its active role in translating the URL into an IP address. Common incorrect answers were of the form that the Domain Name is easier to remember than an IP address. There was also a lot of confusion about the DNS being the preferred way of ensuring all web servers etc. had a unique URL so servers would be able to find requested sites i.e. candidates were describing Domain Name Registration services.

EXAM PAPERS PRACTICE