

# THE UNIVERSITY OF AUCKLAND

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SUMMER SEMESTER, 2015

Campus: City

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## COMPUTER SCIENCE

### An Introduction to Practical Computing

(Time Allowed: TWO HOURS)

**NOTE:**

You must answer **all** questions in this exam.

No calculators are permitted

Answer Section A (Multiple choice questions) on the Teleform answer sheet provided.

Answer Section B in the space provided in this booklet.

There is space at the back for answers that overflow the allotted space.

<b>Surname</b>	
<b>Forenames</b>	
<b>Student ID</b>	
<b>Login (UPI)</b>	

	<b>Question</b>	<b>Mark</b>	<b>Out Of</b>
1 - 25	Multiple Choice		50
26	Programming using Python		10
27	Spreadsheets		10
28	Databases		10
29	LaTeX		10
30	XHTML and CSS		10
	<b>TOTAL</b>		<b>100</b>

**SECTION A****MULTIPLE CHOICE QUESTIONS**

Each question in this section is worth **2 marks**. There is only **one** correct answer for each question. For each question, choose the **best** answer according to the information presented in lectures. Select your preferred answer on the Teleform answer sheet provided by shading in the appropriate box.

**Question 1**

[2 marks] Imagine 4 switches, each able to show 0 or 1. How many different values (or states) can be represented by the 4 switches?

- (a) 1111
- (b) 3
- (c) 8
- (d) 18
- (e) 16

**Question 2**

[2 marks] Which one of the following decimal numbers is equal to the binary number 1011101?

- (a) 93
- (b) 186
- (c) 103
- (d) 46
- (e) 67

**Question 3**

[2 marks] How do the ARM processors often used in mobile devices compare to the Intel processors commonly used in desktop, laptop and server computers?

- (a) ARM processors commonly include secondary storage.
- (b) ARM processors use a reduced set of instructions.
- (c) ARM processors are more powerful but also have a higher power consumption.
- (d) ARM processors have a larger number of CPU cores.
- (e) ARM processors allow the inclusion of extension cards which Intel processors do not.

**Question 4**

[2 marks] What does the abbreviation RAID stand for?

- (a) Redundant Array of Inexpensive Disks.
- (b) Redundant Arrangement for Invaluable Data.
- (c) Red Alert Instant Drive.
- (d) Reclusive Array of Illegal Drives.
- (e) Relayed Arrangement of Interconnected Disks.

**Question 5**

[2 marks] Which of the following is **NOT** an example of freeware?

- (a) Skype.
- (b) Adobe Reader.
- (c) Internet Explorer.
- (d) Microsoft Office.
- (e) Apple iTunes.

**Question 6**

[2 marks] Which of the following statements about software is **FALSE**?

- (a) Open source software may legally be copied.
- (b) Any software that can be downloaded free of charge may be legally copied and distributed to others.
- (c) Computer software is a creative work that is covered by copyright law.
- (d) Shareware is a type of proprietary software.
- (e) Some proprietary software is available free of charge.

**Question 7**

[2 marks] Which historical/political event provided the investments in technology which eventually gave rise to the Internet?

- (a) The Depression.
- (b) World War II.
- (c) The Space Race.
- (d) The Global Financial Crisis.
- (e) The Cold War.

**Question 8**

[2 marks] Which of the following is the most important protocol for communication over the Internet?

- (a) IMAP
- (b) TCP/IP
- (c) FTP
- (d) UDP
- (e) POP3

**Question 9**

[2 marks] What does the @ sign represent in an email address?

- (a) The separation of the DNS from the IP address.
- (b) The separation of the local part of the address from the IP address.
- (c) The separation of the IP address from the mail server domain name.
- (d) The separation of the user's password from the mail server domain name.
- (e) The separation of the local part of the address from the mail server domain name.

**Question 10**

[2 marks] Which one of the following statements about wikis is **FALSE**?

- (a) Wiki pages can be locked by moderators to prevent vandalism.
- (b) A wiki is designed to allow people to collaborate easily.
- (c) Each wiki page has an associated page that allows discussion of the page content.
- (d) The first wiki was created by Tim Berners-Lee.
- (e) Every change that is made to a wiki page is logged and can be viewed in a history list.

**Question 11**

[2 marks] With regard to the URL

"http://yourblog.co.nz/stefan\_w/index.html", in what order do the elements of the URL appear?

- (a) protocol, domain, path, file name
- (b) path, protocol, file name, domain
- (c) domain, protocol, file name, path
- (d) domain, protocol, path, file name
- (e) protocol, domain, file name, path

**Question 12**

[2 marks] What is a proxy?

- (a) A device that prevents unauthorised access to or from a private network.
- (b) A computer which sits between the client and server, intercepts and processes requests.
- (c) A local copy of information for quick access.
- (d) A collection of webpages related to a single topic or theme, normally designed and maintained by a single individual or organisation.
- (e) A hypermedia document designed for the WWW.

**Question 13**

[2 marks] Which of the following is **NOT** a metaphor or idea that underlies research in Artificial Intelligence?

- (a) Abductive inference.
- (b) Deductive reasoning.
- (c) Hypermedia linking.
- (d) Search through a maze.
- (e) Memory retrieval.

**Question 14**

[2 marks] Which one of the following statements about Artificial Intelligence is **TRUE**?

- (a) The ability to recognize sentences in a normal conversation sets human intelligence apart from the intelligence of animals like dogs.
- (b) The field of Artificial Intelligence is only a few years away from producing completely autonomous AI with human-like thought processes and reasoning.
- (c) The 'AI winter' describes a period of time when, within a few months, several major discoveries in different areas of AI research were made.
- (d) Only embodied agents that exist in a physical environment can exhibit intelligence.
- (e) None of the above.

**Question 15**

[2 marks] Which of the following statements about RefWorks is **FALSE**?

- (a) RefWorks lets you insert references into your documents in your choice of citation style.
- (b) RefWorks is Web based software used for reference management.
- (c) RefWorks lets you create a personal database of your references.
- (d) RefWorks lets you copy references from numerous library catalogues into your reference database.
- (e) RefWorks is operating system dependent.

**Question 16**

[2 marks] Which one of the following is **NOT** good advice for the design of PowerPoint presentations?

- (a) The points on a slide should be in note form rather than complete sentences.
- (b) The font size of main points should be different than sub-points to emphasize the hierarchy.
- (c) Use a simple font rather than a complex font to improve the readability of text.
- (d) The colour of text should have high contrast with the background colour.
- (e) Important points should be written in capital letters to emphasize the text.

**Question 17**

[2 marks] Which of the following is **NOT** an important consideration for the **content** of a presentation?

- (a) Carefully consider the topic of the presentation.
- (b) Adjust the information contained in the presentation for the expected audience.
- (c) Improve the readability of the slides by using Sans Serif fonts.
- (d) Logically organize the structure of the content.
- (e) Focus on the main points.

**Question 18**

[2 marks] What is a game mechanic?

- (a) A game mechanic is a game engine parameter that can be set by a game designer.
- (b) A game mechanic is a game developer who specializes in level design.
- (c) A game mechanic is a person who develops video games.
- (d) A game mechanic is a game element used to manipulate challenges.
- (e) A game mechanic is a player who is particularly adept at exploiting bugs in video games.

**Question 19**

[2 marks] A story created by players during game play is called ...

- (a) a co-constructed narrative.
- (b) an interpreted narrative.
- (c) an emergent narrative.
- (d) an embedded narrative.
- (e) an intended narrative.

**Question 20**

[2 marks] What causes “ludonarrative dissonance”?

- (a) Holding two or more contradictory beliefs.
- (b) Moral choices in game narratives.
- (c) Violent game play.
- (d) Immoral game play.
- (e) Misalignment between gameplay and story.

**Question 21**

[2 marks] What is Net Neutrality?

- (a) Net Neutrality is the principle that all Internet users be treated equally.
- (b) Net Neutrality is the principle that all Internet data be treated equally.
- (c) Net Neutrality is the principle that all Internet servers be treated equally.
- (d) Net Neutrality is the principle that all Internet addresses be treated equally.
- (e) Net Neutrality is the principle that all Internet routers be treated equally.

**Question 22**

[2 marks] If you are experiencing cyberstalking, what should you do?

- (a) Meet with the stalker in a public place to discuss his or her infatuation.
- (b) Ignore the stalker.
- (c) Hire a hit man to “take care of it”.
- (d) Try to reason with the stalker.
- (e) Clearly and unambiguously tell the stalker to stop contacting you.

**Question 23**

[2 marks] Why was Alan Turing removed from intelligence work?

- (a) Because he was accused of espionage by an outed KGB double agent.
- (b) Because he was gay.
- (c) Because he was diagnosed with paranoid schizophrenia.
- (d) Because he visited Germany after World War II.
- (e) Because there were no more German cyphers to break.

**Question 24**

[2 marks] Who invented the Internet?

- (a) The Xerox Palo Alto Research Centre.
- (b) Al Gore.
- (c) Tim Berners-Lee.
- (d) Many different people and groups.
- (e) Vint Cerf and Robert Kahn.

**Question 25**

[2 marks] The best analogy for the modern surveillance state is:

- (a) The Eye of Sauron (from *The Lord of the Rings*).
- (b) The Sprawl (from *Neuromancer*).
- (c) John Searle’s “Chinese Room” thought experiment.
- (d) The Ministry of Truth (from *Nineteen Eighty-Four*).
- (e) The World State (from *Brave New World*).

**THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.**



## SECTION B

Answer all questions in this section in the space provided. If you run out of space, please use the Overflow Sheet and indicate in the allotted space that you have used the Overflow Sheet.

### 26. Programming Using Python (10 marks)

- (a) Write a Python program that prompts the user for a positive integer number. The user may enter a positive, zero, or negative number. If the number entered by the user is positive the program should print out the *first five entries of that number's times table*, otherwise it should tell the user that they have entered an invalid value.

The following **two examples** show the exact formatting expected for the prompts and output. Your program must produce the same output as shown below, given the input shown below.

**Example 1:**

```
Enter a positive integer: 8
The 8 Times Table:
8 * 1 = 8
8 * 2 = 16
8 * 3 = 24
8 * 4 = 32
8 * 5 = 40
```

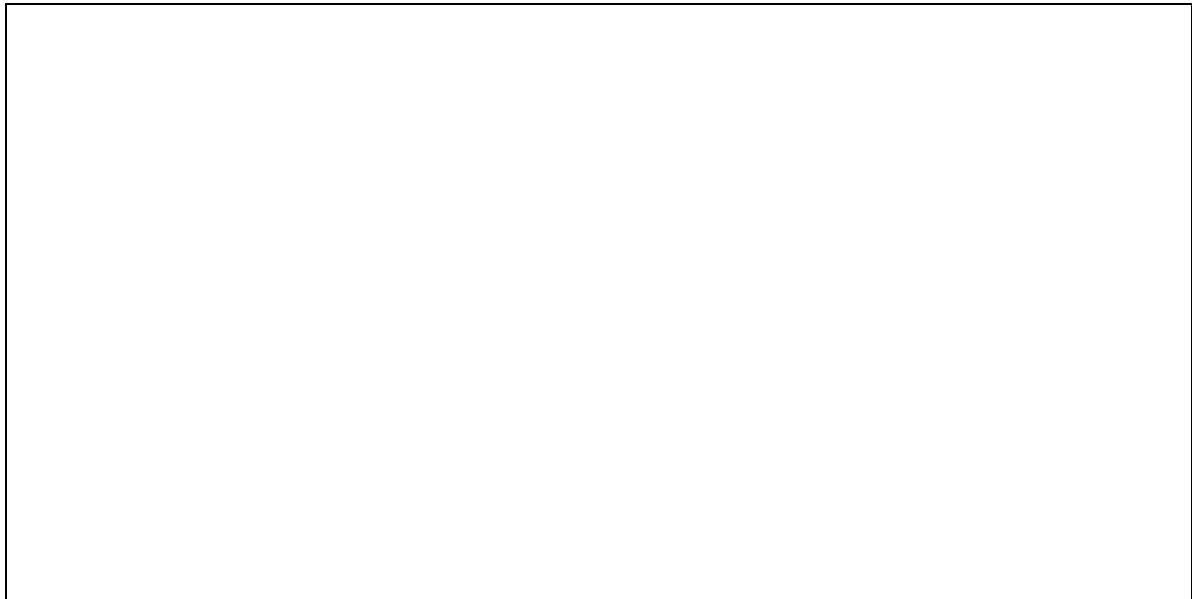
**Example 2:**

```
Enter a positive integer: -2
-2 is not a positive integer!
```

(4 marks)

(b) Show the output from the following program.

```
count = 1
end = 6
while count < end:
    n = count * (count + 1) // 2
    print(n)
    count = count + 1
```



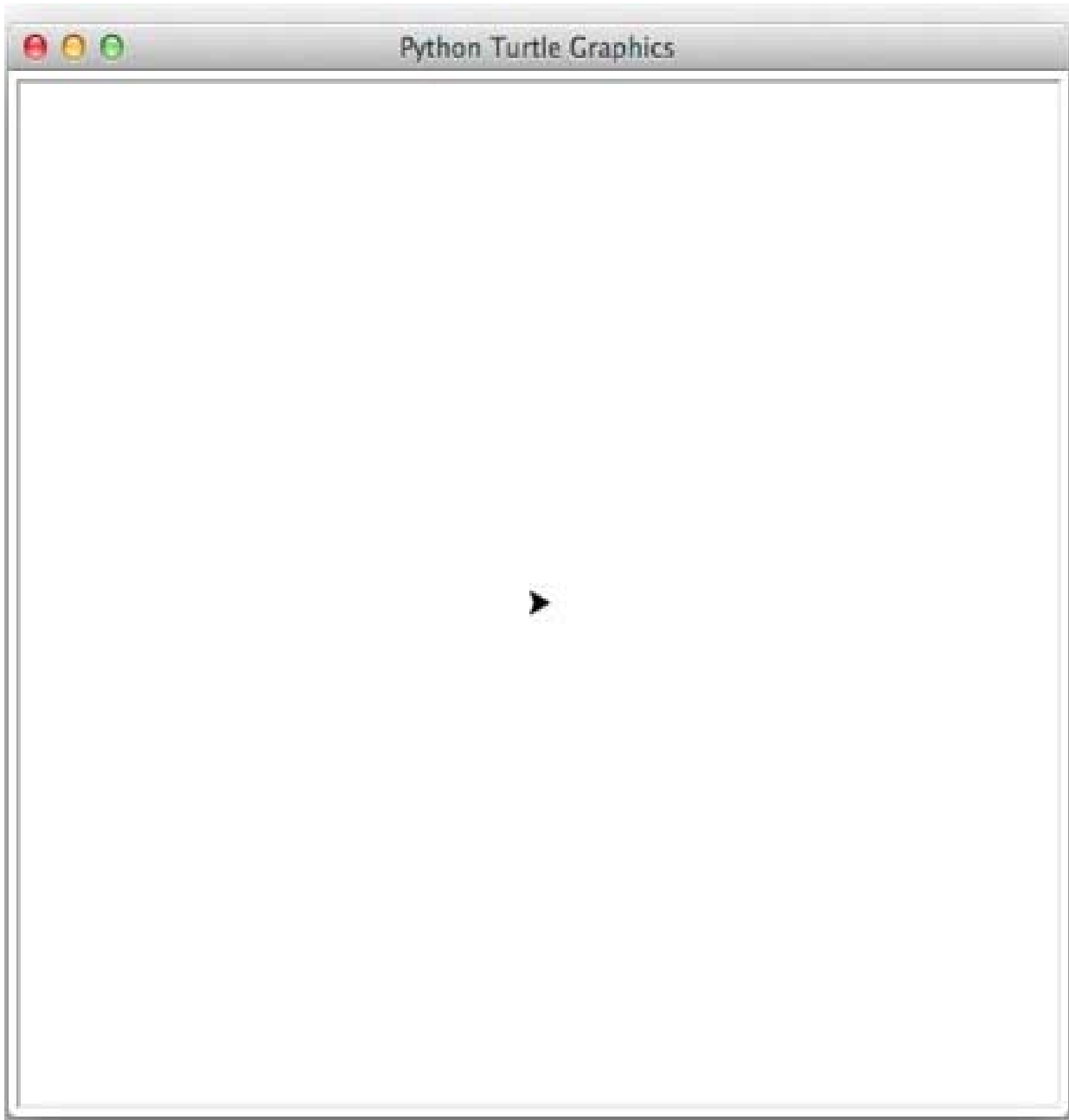
(3 marks)

(c) On the following page, draw the output produced by the turtle in the following Python program. Assume that the turtle begins in the middle of the window facing right and that the window is approximately 400 steps wide.

```
import turtle

steps = 50
angle = 90
sides = 8
count = 0

while count < sides:
    if count < 4:
        turtle.forward(steps)
    else:
        turtle.forward(steps*2)
    turtle.left(angle)
    count = count + 1
```



(3 marks)

**27. Spreadsheets (10 marks)**

The following spreadsheet displays an invoice for a parallel importer that imports electronic products and watches to New Zealand.

	A	B	C	D	E	F	G	H	I
1	<b>Item</b>	<b>Unit Price</b>	<b>Quantity</b>	<b>Amount</b>	<b>Currency</b>	<b>Amount in NZD</b>		<b>Currency</b>	<b>Exchange Rate</b>
2	Google Nexus 9 (32 gig)	479.99	10	4799.90	USD	6191.87		USD	1.29
3	Orient Diver 300m	168000.00	3	504000.00	JPY	5544.00		GBP	2.02
4	Nikon D750 SLR	2570.65	5	12853.25	SGD	12596.19		EUR	1.58
5	Rega RP10 Turntable	3598.00	2	7196.00	GBP	14535.92		AUD	1.05
6	LG 79" Ultra HD LED TV	7496.00	2	14992.00	AUD	15741.60		JPY	0.011
7	Steinhart Ocean 44 GMT	470.00	3	1410.00	EUR	2227.80		SGD	0.98
8	EVGA GTX980 4GB	4344.67	10	43446.70	CNY	9123.81		CNY	0.21
9					<b>Total:</b>	65961.18			
10					<b>Credit:</b>	Yes			

- (a) What is the best formula to use in cell **D2**? Your formula should fill down from **D2** to **D8** correctly.

(1 mark)

- (b) What is the best formula to use in cell **F2**? Your answer should use the **VLOOKUP** function to retrieve the appropriate **Exchange Rate** from the **Exchange Rate Table** in cells **H2:I8**. The VLOOKUP function has the following syntax:

`VLOOKUP(lookup_value, table_array, col_index_num, range_lookup)`

**Note:** Your formula should fill down from **F2** to **F8** correctly.

= \_\_\_\_\_ \* VLOOKUP ( \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ )

(5 marks)

- (c) Cell **F9** calculates the total cost of all the items recorded in this invoice. What is the best formula to use in cell **F9**?

(1 mark)

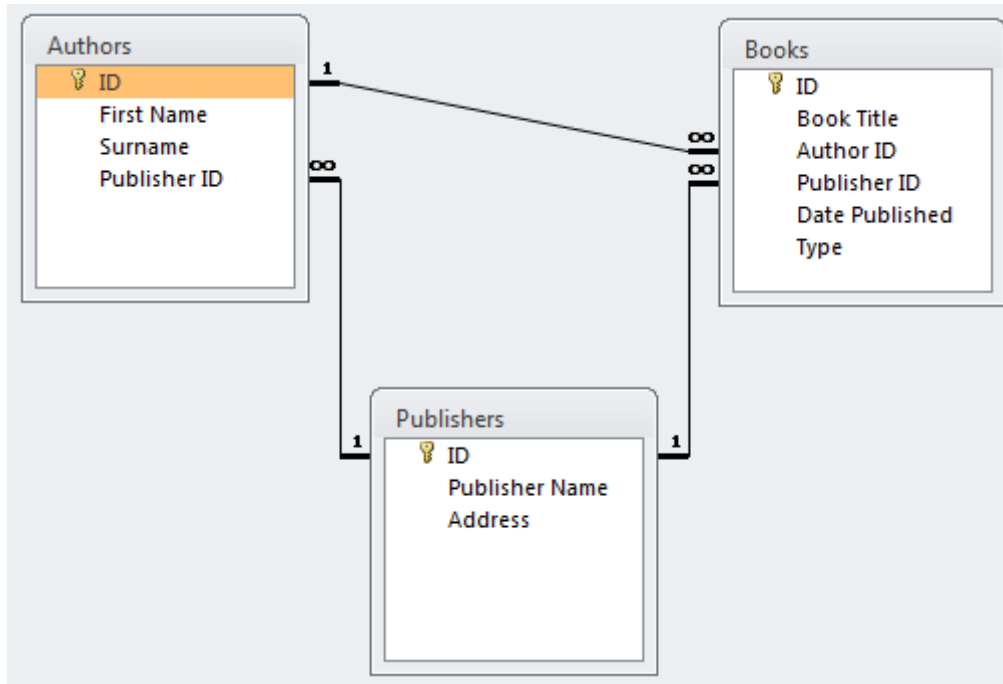
- (d) Cell **F10** displays whether or not the parallel importer needs to use credit for its purchase. Credit is required for invoices exceeding \$30000 NZD. Cell **F10** should display “**Yes**” if the invoice total exceeds 30000; otherwise it should display “**No**”. What is the best formula to use in cell **F10**? Your answer must use an **IF** function.

**=IF ( \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ )**

(3 marks)

### 28. Databases (10 marks)

Use the following Microsoft Access relationship diagram to answer the questions in this section. Note that the primary key of each table uses the AutoNumber type to ensure uniqueness.



(a) State the name of any foreign key(s) in the **Books** table.

(1 mark)

(b) What is the appropriate **data type** for the **Publisher ID** field in the **Books** table?

(1 mark)

- (c) Complete the query by example (QBE) form below so that it generates a query that displays the **Book Title**, **Date Published**, and **Type** of every book written by **Stephen King**. The results should be sorted in **descending order** based on the **Date Published**. Some example results from the query might be:

Book Title ▾	Date Published ▾	Type ▾
Revival	11/11/2014	E-Book
Revival	11/11/2014	Audiobook
Revival	11/11/2014	Hardcover
The Shining	28/01/1997	Paperback
Cujo	8/09/1981	Paperback
Pet Sematary	14/11/1978	Paperback

Field:					
Table:					
Sort:					
Show:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:					
or:					

(4 marks)

- (d) Write an SQL query that displays the **Book Title** and **Date Published** of all books whose type is "**Paperback**". The results should be sorted in **ascending order** based on the **Book Title**. Some example results from the query might be:

Book Title ▾	Date Published ▾
Abarat	30/08/2011
Cujo	8/09/1981
Lost World	1/09/1995
Pet Sematary	14/11/1978
Song Of Kali	15/01/1998
The Racketeer	27/08/2013
The Shining	28/01/1997

(4 marks)

## 29. LaTeX (10 marks)

On the following page, complete the LaTeX code that will produce the output below:

Chemistry

A. Lecturer

Summer School 2015

### 1 Chemical Reactions

The most general description of a *chemical reaction network* includes the term

$$\sum_{i=1}^N s_{ij} X_i \tag{1}$$

where

- $j$  is the reaction index running from 1 to  $R$ ,
- $X_i$  denotes the  $i$ -th chemical species and
- $\pi$  is irrelevant. . .

The following LaTeX commands have been included as a reference. You will not need to use all of these commands. Note that the basic document structure has been completed for you.

<i>Normal commands</i>	<i>Environments</i>	<i>Math mode commands</i>
<code>\emph{}</code>	<code>itemize</code>	<code>\$</code>
<code>\section{}</code>	<code>enumerate</code>	<code>\sqrt{}</code>
<code>\subsection{}</code>	<code>verbatim</code>	<code>\geq</code>
<code>\subsubsection{}</code>	<code>flushright</code>	<code>\frac{ }{ }</code>
<code>\large</code>	<code>center</code>	<code>\left(</code>
<code>\textbf{}</code>	<code>quote</code>	<code>\right)</code>
<code>\title{}</code>	<code>displaymath</code>	<code>\pi</code>
<code>\author{}</code>	<code>equation</code>	<code>\sum_{ } ^{ }</code>
<code>\date{}</code>	<code>quotation</code>	<code>^</code>
<code>\maketitle</code>		<code>-</code>
<code>\item</code>		
<code>\ldots</code>		



```
\documentclass[a4paper]{article}
\begin{document}
```

```
\end{document}
```

(10 marks)

CONTINUED

### 30. HTML5 and CSS (10 marks)

The following screenshot shows the body of a web page created using HTML5 and CSS:



Complete the HTML5 code below so that it produces the output shown above.

You **must** use the styles defined in the internal style sheet in the head section below, and **must not** define any new styles.

**Note:** The url for the FIFA Club World Cup webpage is:  
"http://www.fifa.com/clubworldcup".

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>HTML5 Exam Question</title>
<style type="text/css">
h1, h2{
  background-color: #C0C0C0;
  text-align: center;
  font-family:sans-serif;
}
table, tr, td{
  border: 1px solid black;
}
```

```
#tableheader{  
  font-size: large;  
  font-weight: bold;  
  text-align: center;  
}  
  
.position{  
  text-align: center;  
}  
</style>  
</head>  
  
<body>
```

```
<!-- Main Heading -->
```

(1 mark)

```
<!-- "About" section -->
```

(3 marks)

```
<!-- "Some Past Winners" section -->
```

(2 marks)

<!-- "2014 Tournament" section -->

(4 marks)

</body>  
</html>

CONTINUED

**- Overflow Sheet 1 -**

**Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.**

**- Overflow Sheet 2 -**

**Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.**

**Rough Working – This page will not be marked**

**Rough Working – This page will not be marked**

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