THE UNIVERSITY OF AUCKLAND

SECOND SEMESTER, 2019
Campus: City

COMPUTER SCIENCE

An Introduction to Practical Computing

(Time Allowed: TWO hours)

NOTE:
You must answer **all** questions in this exam.
Calculators are NOT 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.

Surname	
Forename(s)	
Student ID	
Login (UPI)	

	Question	Mark	Out Of
1 - 30	Multiple Choice		30
31	Programming using Python		10
32	Spreadsheets		12
33	Databases		13
34	HTML5 and CSS		20
35	LaTeX		15
	TOTAL		100

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SECTION A : MULTIPLE CHOICE QUESTIONS

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
[1 mark] Which of the following is NOT hardware?

(a) Mouse
(b) System unit
(c) Monitor
(d) Keyboard
(e) Spreadsheet

Question 2
[1 mark] Which of the following is volatile memory?

(a) CD
(b) SSD
(c) RAM
(d) DVD
(e) HDD

Question 3
[1 mark] Who did Ada Lovelace collaborate with?

(a) Steve Wozniak
(b) Charles Babbage
(c) Steve Jobs
(d) Bill Gates
(e) Alan Turing

Question 4
[1 mark] Which of the following was a real computer and not a hypothetical or imaginary machine?

(a) The Colossus
(b) The Analytical Engine
(c) The Memex
(d) The Tardis
(e) The Turing Machine

Question 5
[1 mark] Which of the following people founded a company that later became part of the International Business Machine Corporation (IBM)?

(a) Alan Turing
(b) Doug Engelbart
(c) Herman Hollerith
(d) Bill Gates
(e) Alan Kay

Question 6
[1 mark] What was the first packet switching network?

(a) Ethernet
(b) Intranet
(c) Internet
(d) World Wide Web
(e) ARPANET

Question 7
[1 mark] With regard to modems, what does DSL stand for?

(a) Digital Subscriber Line
(b) Domain Service List
(c) Durable Support List
(d) Direct Service Level
(e) Date Service Link

Question 8
[1 mark] Who sent the first email?

(a) Alan Turing
(b) Ray Tomlinson
(c) Steve Jobs
(d) Ada Lovelace
(e) Alan Kay

Question 9
[1 mark] What protocol is used for sending email?

(a) SMTP
(b) IMAP
(c) DNS
(d) FTP
(e) POP3

Question 10

[1 mark] Which of the following is NOT a micro-blogging platform?

    (a) Pinterest

    (b) eBay

    (c) Tumblr

    (d) Instagram

    (e) Twitter

Question 11

[1 mark] What does "wiki" mean in Hawaiian?

    (a) Open

    (b) Cheap

    (c) Quick

    (d) Simple

    (e) Easy

Question 12

[1 mark] Where was the World Wide Web developed?

    (a) Harvard

    (b) Apple

    (c) Silicon Valley

    (d) CERN

    (e) IBM

Question 13

[1 mark] Which of the following is NOT a web search engine?

    (a) DuckDuckGo

    (b) Google

    (c) Yahoo search

    (d) Bing

    (e) Pinterest

Question 14

[1 mark] In which decade was the term "Artificial Intelligence" first used?

    (a) 1950s

    (b) 1960s

    (c) 1970s

    (d) 1980s

    (e) 1990s

Question 15
[1 mark] What was IBM's famous chess playing computer called?

    (a) Kasparov
    (b) Deep Thought
    (c) Deep Mind
    (d) AlphaChess
    (e) Deep Blue

Question 16
[1 mark] How many characters can ASCII represent?

    (a) 512
    (b) 256
    (c) 128
    (d) 2048
    (e) 1024

Question 17
[1 mark] What is RefWorks?

    (a) A database
    (b) A word processor
    (c) A text editor
    (d) An online reference manager
    (e) A spreadsheet

Question 18
[1 mark] How many numbers can be represented by two (2) bits?

    (a) 4
    (b) 8
    (c) 2
    (d) 6
    (e) 10

Question 19
[1 mark] What is the binary equivalent of 123?

    (a) 0101101
    (b) 1111011
    (c) 1011011
    (d) 1111001
    (e) 1001101

Question 20
[1 mark] What is the resolution of an image that is 5000 pixels wide and 2000 pixels high?

    (a) 14000 pixels
    (b) 10 megapixels
    (c) 1 megapixel
    (d) 7000 pixels
    (e) None of the above.

Question 21
[1 mark] Which of the following statements are TRUE?

I. The SVG file format is ideal for storing photographs.
II. The JPEG file format is ideal for storing graphics.
III. Both the PNG and GIF file formats use lossless compression.
IV. You can scale an SVG image without loss of image quality.

    (a) I and IV
    (b) II and IV
    (c) I and III
    (d) III and IV
    (e) I and II

Question 22
[1 mark] Which of the following statements is TRUE?

    (a) Perfect information games are characterized by randomness playing a big role in gameplay.
    (b) Chess is an imperfect information game.
    (c) The player who wins a role-playing game is called the game master.
    (d) The Greek historian Herodotus invented dice games.
    (e) Movement in a skill game is determined by successful action or performance.

Question 23
[1 mark] Which of the following is NOT used as a digital game medium?

    (a) Proprietary cartridges
    (b) Digital downloads
    (c) Cassettes
    (d) Blu-Ray discs
    (e) None of the above. They are all used as a digital game medium.

Question 24
[1 mark] Which of the following statements is TRUE?

   (a) The term microtransaction is used to describe purchasing a cheap digital game.
   (b) Digital game development is primarily focused on programming.
   (c) Downloadable content refers to additional content made and sold for a game after its release.
   (d) eSports are only popular in Korea.
   (e) A games studio is a company responsible for funding, marketing and distributing digital games.

Question 25
[1 mark] Which of the following statements about software are TRUE?

I.   Software consists of instructions and data.
II. Software is executed directly from secondary storage.
III. Microsoft Word is an example of system software.
IV. Software encodes files using particular file formats.

   (a) II and IV
   (b) I and IV
   (c) II, III and IV
   (d) III and IV
   (e) I and II

Question 26
[1 mark] Jason runs a software development company. While most of the software released by his company is commercial software, his company has recently released freeware in the hope that users of this freeware will be enticed to purchase some of the company's commercial software. Which of the following terms best describes this freeware?

   (a) Freemium
   (b) Nagware
   (c) Loss leader
   (d) Abandonware
   (e) Adware

Question 27
[1 mark] Which of the following is NOT associated with too much interaction with digital technology?

   (a) Unrealistic expectations
   (b) Better social skills
   (c) Checking
   (d) Depression
   (e) Narcissism

Question 28
[1 mark] Which of the following is NOT associated with too much interaction with digital technology?

  (a) Anorexia
  (b) Muscle tightness and spasms
  (c) Hearing loss
  (d) Numbness and tingling
  (e) CVS

Question 29
[1 mark] A keylogger is an example of what type of malware?

  (a) Trojan
  (b) Spyware
  (c) Worm
  (d) Logic Bomb
  (e) Virus

Question 30
[1 mark] Which of the following is NOT a reason why it is hard to remain anonymous on the Internet?

  (a) Most websites perform ID checks on their users.
  (b) Advertisers are able to effectively track users.
  (c) Many websites demand personal information.
  (d) Governments are expanding online surveillance.
  (e) Laws require ISPs to keep records of IP addresses assigned to users.

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QUESTION/ANSWER BOOKLET FOLLOWS

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.

31. Programming Using Python (10 marks)

(a) Write a Python program that prompts the user to enter an integer value as in the examples below. The program will then calculate and print the sum of all the odd numbers from 0 up to and including the number the user has entered.

For example, if the user enters 7, the sum of all odd numbers between 0 and 7 would be 16 $(1 + 3 + 5 + 7)$. You can assume that the user will always enter an integer value larger than zero.

Here are two examples of the program running with different values entered by the user. User input is indicated in the examples with bold and italicized font.

Example 1:
```
Enter a positive integer: 7
The sum of odd numbers from 0 to 7 is 16
```
Example 2:
```
Enter a positive integer: 31
The sum of odd numbers from 0 to 31 is 256
```

(4 marks)

(b) Show the output of the following program.

```
count = 1
end = 6
total = 0
while count < end:
    total = total + count
    if count % 2 == 1:
        print(total)
    count = count + 1
print("Done!")
```

(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 800 steps wide.

```
import turtle
count = 1
end = 6
step = 50
angle = 90
while count <= end:
    if count % 2 == 0:
        step = step * 2
    turtle.forward(step)
    turtle.left(angle)
    count = count + 1
```
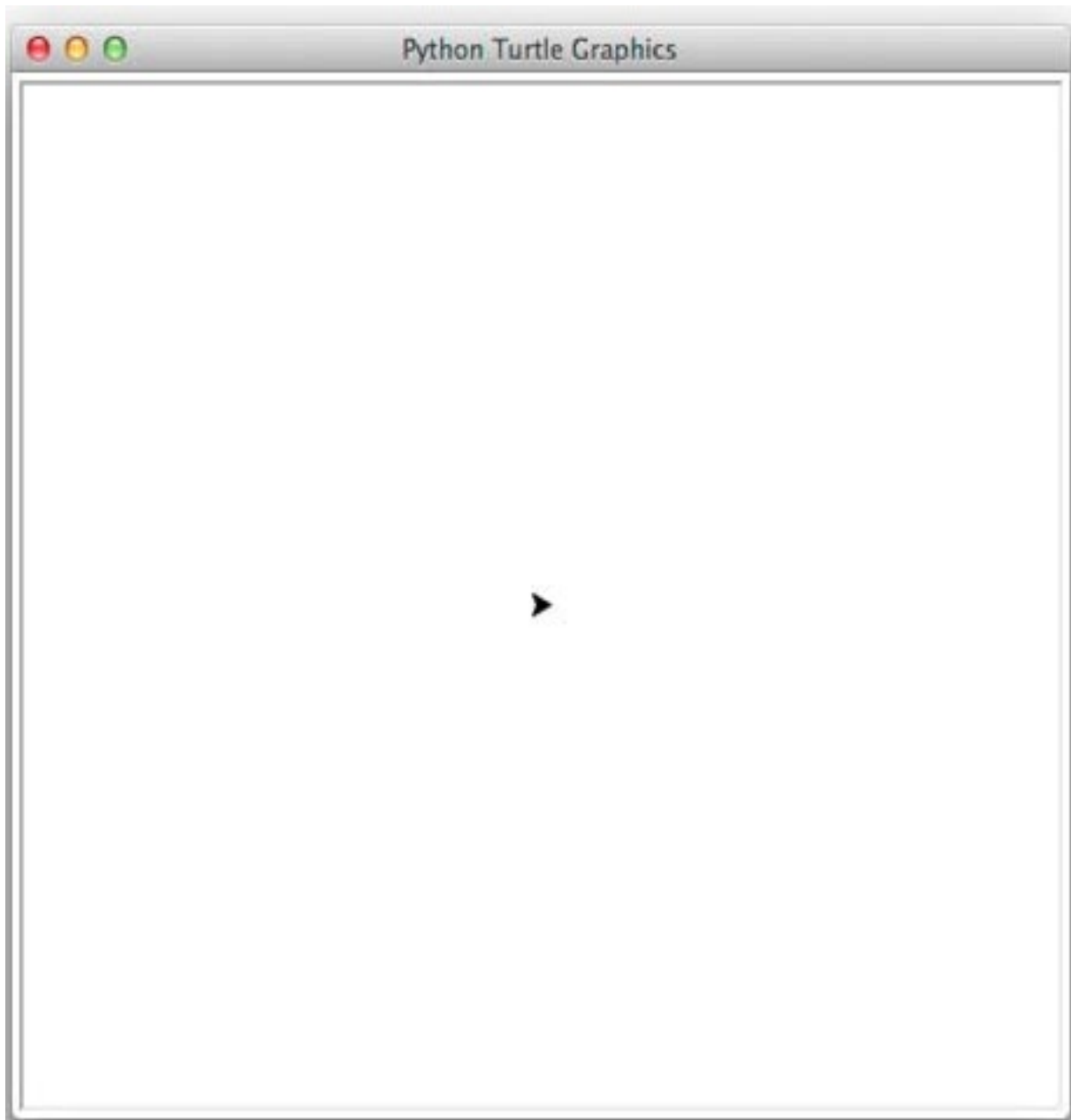
(3 marks)

32. Spreadsheets (12 marks)

The following spreadsheet displays information about product sales for an online clothing retailer. Columns **E** to **K** contain information on a customer's invoice.

	A	B	C	D	E	F	G	H	I	J	K
1	Online Clothing Retailer										
2											
3	Size	S	M	L	XL	2XL	3XL	4XL	5XL		
4	Cost Modifier	1	1	1	1.1	1.1	1.2	1.2	1.3		
5											
6	Clothing Table				Invoice						
7	Code	Type	Prices		Code	Size	Number	Type	Price	Cost Modifier	Cost
8	0000	Jeans	$29.99		0000	2XL	2	Jeans	$29.99	1.1	$65.98
9	0001	Chinos	$25.99		0110	4XL	2	Jackets	$59.99	1.2	$143.98
10	0010	Shorts	$15.99		0011	3XL	3	T-Shirts	$16.99	1.2	$61.16
11	0011	T-Shirts	$16.99		0111	4XL	1	Coats	$69.99	1.2	$83.99
12	0100	Shirts	$30.99		0001	2XL	2	Chinos	$25.99	1.1	$57.18
13	0101	Hoodies	$34.99		0010	2XL	3	Shorts	$15.99	1.1	$52.77
14	0110	Jackets	$59.99								
15	0111	Coats	$69.99		Shipping	$30.00				Subtotal	$465.05
16										Shipping	Free
17										Total	$465.05

(a) What is the best formula to use in Cell **H8** to display the type of clothing ordered? The Clothing Table is located in Cells **A8 : C15**. Your answer must use a **VLOOKUP** function.

Note: Your formula must be able to be filled down from **H8** to **H13** correctly.

=VLOOKUP (_____ , _____ , _____ , _____)

(2 marks)

(b) What is the best formula to use in Cell **I8** to display the price of one item of the type of clothing ordered? The Clothing Table is located in Cells **A8 : C15**. Your answer must use a **VLOOKUP** function.

Note: Your formula must be able to be filled down from **I8** to **I13** correctly.

=VLOOKUP (_____ , _____ , _____ , _____)

(2 marks)

(c) What is the best formula to use in Cell **J8** to display the cost modifier to be applied to the price of an item of clothing based on its size? The table containing information on size and associated cost modifiers is located in Cells **B3 : I4**. Your answer must use an **HLOOKUP** function.

Note: Your formula must be able to be filled down from **J8** to **J13** correctly.

=HLOOKUP (_____ , _____ , _____ , _____)

(2 marks)

(d) What is the best formula to use in Cell **K8** to display the cost of buying *X* items of cost *Y*, with a cost modifier of *Z*? To calculate this cost, you will need to multiply these three values together.

Note: Your formula must be able to be filled down from **K8** to **K13** correctly.

=

(2 marks)

(e) The cost of shipping an order can be found in Cell **F15.** What is the best formula to use in Cell **K16**? You want to display the standard shipping cost in this cell if the subtotal of the invoice is less than $50, or the text "Free" otherwise. Your answer must use an **IF** function.

=IF (_____ , _____ , _____)

(2 marks)

(f) What is the best formula to use in Cell **K17**, to display the total cost of the invoice? If shipping is free, the total cost of the invoice is the same as the subtotal. Otherwise it is the cost of the subtotal plus the cost of shipping. Your answer must use an **IF** function.

=IF (_____ , _____ , _____)

(2 marks)

33. Databases (13 marks)

A Research Lab has a database to keep track of which researchers are assigned to which projects. The three tables below (Researcher, Projects and Assignments) form part of that database.

Researchers are the research people who can be assigned to work on projects. Projects are the projects that research people can be assigned to, and the Assignments table links the researchers to the projects that they work on.

Here are the contents of each of the three tables in datasheet view:

Researcher

Research Id	RName	EdLevel	Max Hours per week
1	Abe Act	PhD	60
2	Bob Boy	MSc	40
3	Cal Cot	BSc (Hons)	20

Projects

Project Id	PName	Topic	Est Total Hours
1	CurCan	Cure Cancer	1000
2	EndPov	End Poverty	5000
3	PreWar	Prevent War	10000

Assignments

Assignment Id	Project Id	Researcher Id	Hours per week
1	1	1	30
2	1	2	40
3	2	3	25

(a) State the **primary** key(s) of the **Researcher** table.

> Primary Key(s):

(1 mark)

(b) State the **primary** key(s) and **foreign** key(s), if any, of the **Assignments** table.

> Primary Key(s):
>
> Foreign Key(s):

(2 marks)

(c) Show the output of the following QBE query:

Field:	RName	PName	Hours per week
Table:	Researcher	Projects	Assignments
Sort:	Ascending	Ascending	
Show:	☑	☑	☑
Criteria:			
or:			

(4 marks)

(d) In the space below, write an SQL query that displays the **Researcher Id**, **Project Id**, and **Hours per week** from the **Assignments** table where the **Hours per week** is less than **35**. The output should be displayed in ascending order by **Researcher Id**. An example of the results obtained by running the query is shown below.
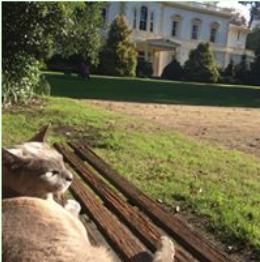
Researcher Id ▾	Project Id ▾	Hours per week ▾
1	1	30
3	2	25

(6 marks)

34. HTML5 and CSS (20 marks)

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

Complete the HTML5 code on the following pages so that it produces the output shown above.

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

Note:

    (1) The URL for Governor Greys's Facebook page is
        `"https://www.facebook.com/govnor.grey/"`.

    (2) The image is stored in a file called `"GovernorGrey.jpg"` in the same folder as the HTML file.

    (3) There are two sections (the "Pastimes" section and the "Cat Chat" section).

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>HTML/CSS Exam Question</title>
<style>
  body {background-color:#E6FFE6;
        font-family: "Arial", "Calibri", Sans-Serif}
  h1 {background-color:rgb(0,0,0); color:#E6FFE6;
      text-transform:uppercase; text-align:center}
  h2 {background-color:rgb(0,0,0); color:#E6FFE6;
      font-variant:small-caps}
  table, tr, td { border: 2px solid black;}
  #emphasis{font-size:large; color:red}
  #center {text-align:center}
  #tablehead {background-color:rgb(0,0,0); color:#E6FFE6;
              font-weight:bold; text-align:center}
  .catchat{font-style:italic; font-weight:bold}
  .pastime{text-align:center; font-weight:bold}
</style>
</head>
```

```
<body>
```

<!-- Main Heading -->

(1 mark)
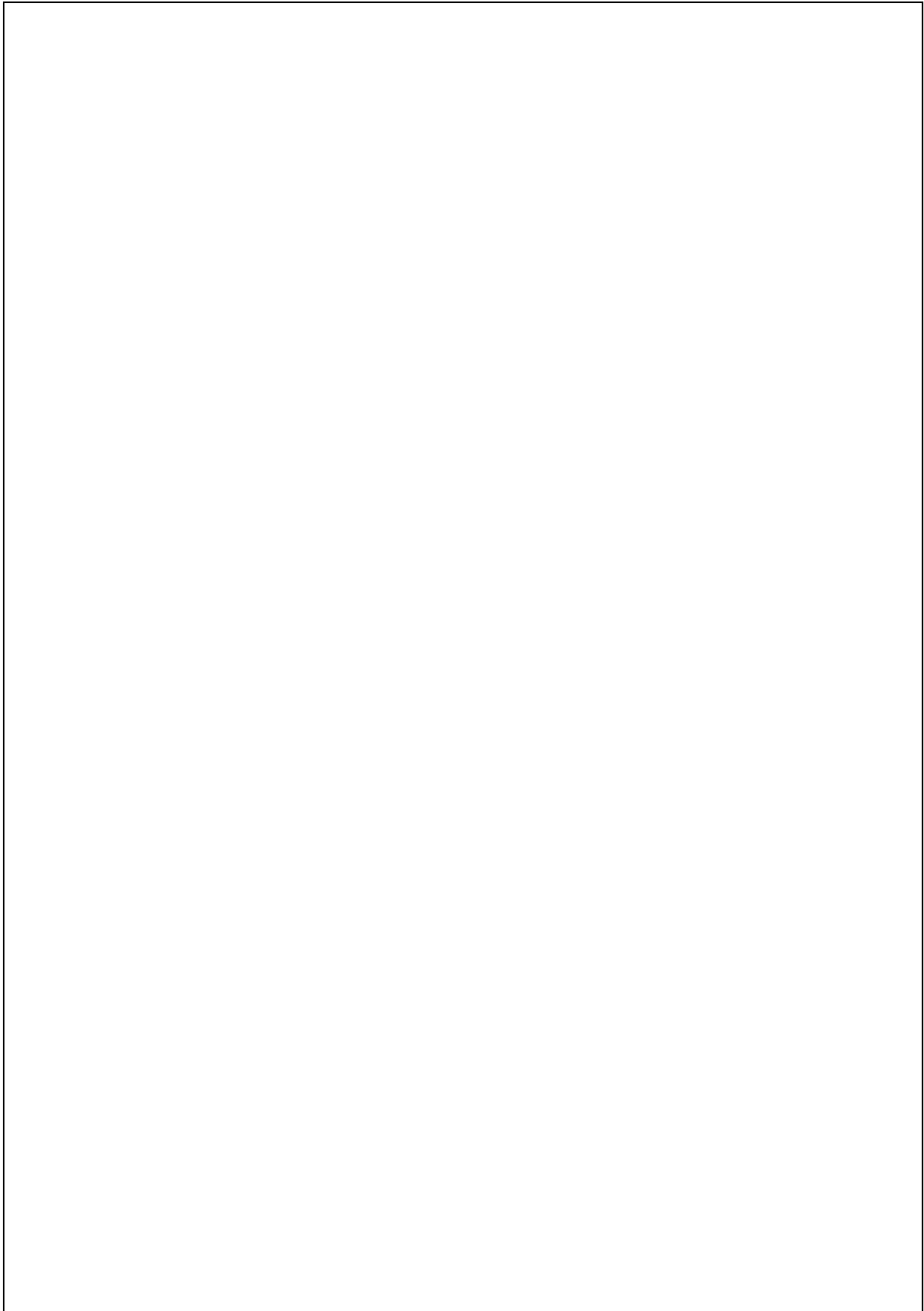
<!-- Image -->

(3 marks)

<!-- First Paragraph -->

(3 marks)

<!-- "Pastimes" Section -->

(6 marks)

`<!-- "Cat Chat" Section -->`

(7 marks)

```
</body>
</html>
```

35. LaTeX (15 marks)

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

The image is stored in a file called **Trig.png** and is in the same folder as the LaTeX code. When inserted into the document, the image should be **centred** and **5 cm wide**.

The following LaTeX commands have been included as a reference. You will not need to use all of these commands.

Normal commands	Environments	Math mode commands
\usepackage{graphicx}	itemize	$
\section{}	enumerate	\sqrt{}
\subsection{}	verbatim	\frac{}{}
\title{}	flushright	\tan
\author{}	center	\sin
\date{}	quote	\sum_{}^{}
\maketitle	displaymath	\pi
\item	equation	\theta
\textbf{}	quotation	^
\emph		\left(
\includegraphics{}		\right)
\footnote{}		

```
\documentclass[a4paper]{article}

\begin{document}
```

```
\end{document}
```

(15 marks)

- 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