THE UNIVERSITY OF AUCKLAND

SUMMER 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		15
33	Databases		15
34	HTML5 and CSS		15
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] A $500 computer in year X takes around 40 minutes to do a task. A $500 computer in 2020 takes around 10 minutes to do the same task. What year is X according to Moore's Law as taught in the lectures?

    (a) 2017.
    (b) 2011.
    (c) 2015.
    (d) 2016.
    (e) 2010.

Question 2
[1 mark] The Apple iPhone XS introduced in September 2018 uses the Apple A12 Bionic chip. This chip is an example of …

    (a) CPU.
    (b) SoC.
    (c) SSD.
    (d) GPU.
    (e) RAM.

Question 3
[1 mark] What is the decimal representation of $110_2 + 1110_2$?

    (a) 6
    (b) 5
    (c) 20
    (d) 14
    (e) 10

Question 4
[1 mark] How many different values are possible with 6 bits?

    (a) 8
    (b) 32
    (c) 4
    (d) 64
    (e) 16

Question 5

[1 mark] Which of the following is NOT an example of application software?

    (a) Internet Explorer.
    (b) Mozilla Firefox.
    (c) Microsoft Office.
    (d) Apache OpenOffice.
    (e) Apple iOS.

Question 6

[1 mark] Which of the following statements about file formats is FALSE?

    (a) A file extension is a string of characters at the end of a filename preceded by a dot.
    (b) Changing the file extension will change the way information in the file is encoded.
    (c) File formats can be open or proprietary.
    (d) Changing the file extension does not change content in the file.
    (e) The Windows operating system uses the file extension to determine the application that should be used to open the file.

Question 7

[1 mark] What is the maximum number of unique IP addresses possible in the case of IP version 6?

    (a) 2^{128}
    (b) 2^{64}
    (c) 2^{8}
    (d) 2^{32}
    (e) 2^{18}

Question 8

[1 mark] Which of the following statements about the Internet backbone is FALSE?

    (a) There are extra backbone cables crossing the oceans for additional bandwidth and redundancy.
    (b) Internet backbone cables are generally owned by private companies.
    (c) The backbone cables connect countries together to form the global Internet.
    (d) The Internet's backbone consists of high-capacity fibre optic cables.
    (e) Internet backbone cables are free to use.

Question 9
[1 mark] Which protocol would be suitable for someone who wants to retrieve his/her emails on different devices such as desktop, laptop, tablet, and phone?

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

Question 10
[1 mark] Which of the following systems uses asynchronous communication?

    (a) Skype video call.
    (b) Facebook Chat.
    (c) Email.
    (d) Messaging on Snapchat.
    (e) Telephone call.

Question 11
[1 mark] Which of the following would be the output in the Stage I Wiki for the following wiki markup?

```
'''''Hello'''''
```

    (a) ***Hello***
    (b) *Hello*
    (c) Hello
    (d) **Hello**
    (e) *HELLO*

Question 12
[1 mark] Which of the following statements about Wikipedia is FALSE?

    (a) Wikipedia runs on Mediawiki software.
    (b) Information on Wikipedia is provided by a select group of highly qualified experts.
    (c) Wikipedia was launched by Jimmy Wales and Larry Sanger in 2001.
    (d) Wikipedia has automated and manual mechanisms for handling vandalism.
    (e) Most pages in Wikpedia can be edited by any general user.

Question 13

[1 mark] Who created the World Wide Web?

  (a) Tim Berners-Lee.
  (b) Marc Andreessen.
  (c) Ward Cunningham.
  (d) Shawn Fanning.
  (e) Sean Parker.

Question 14

[1 mark] Which of the following statements about search engines is FALSE?

  (a) Search algorithms used by search engines are a trade secret.
  (b) Search engines use spiders to crawl across the WWW to scan webpages.
  (c) Spiders are programs that follow links and gather information from webpages.
  (d) Search engines are websites that help a user to search for information on the WWW.
  (e) For any search term, search engines provide the exact same results to all users.

Question 15

[1 mark] Which of the following is NOT a definition of browser cookies?

  (a) A small amount of data generated by a website and saved by your web browser.
  (b) A way for the website to keep track of your preferences.
  (c) Data used for identification of returning website visitors.
  (d) A tracking technique capable of identifying individual users based on their browser and device settings.
  (e) A small text file created by a website and stored in the user's computer.

Question 16

[1 mark] Pat finds photos of a friend on a blog that are hurtful for Pat's friend's reputation. Under the Harmful Digital Communications Act 2015, what are Pat's friend's main options?

  (a) Apply to the district court with an order and apply to Netsafe for an order.
  (b) Use an approved communication format to complain to the author, and if no response, the district court will send the complaint.
  (c) Send information to the online portal of the local police or to the central non-profit for consumer protection.
  (d) Use an approved communication format to complain to the author and if no response, Netsafe will send the complaint to the district court.
  (e) Complain to Netsafe and put in a district court order or complain to the blogging site containing the photos.

Question 17

[1 mark] What are the characters for the following ASCII code?

72 101 108 108 111 87 111 114 108 100

   (a) hELLOwORLD
   (b) HelloWorld
   (c) H101eehWke100
   (d) h101EEHwKE100
   (e) None of the above.

Question 18

[1 mark] How are word processors distinguished from text editors?

   (a) Word processors enable processing commands.
   (b) Text editors are What You See Is What You Get (WYSIWYG).
   (c) Word processors enable formatting.
   (d) Word processors only use proprietary encoding standards.
   (e) Text editors use open standards.

Question 19

[1 mark] "Checking", i.e., repeatedly accessing digital devices, tends to be in response to:

   (a) Excessive texting related to mood disorders.
   (b) A self-promotion activity related to narcissism.
   (c) External interruptions such as notifications.
   (d) Excessive reporting of activities on social media.
   (e) Internal interruptions, also called self-interruptions.

Question 20

[1 mark] Computer Vision Syndrome (CVS) refers to:

   (a) The "tunnel vision" of computer use whereby people disproportionately think about digital sources.
   (b) The outcome of prolonged periods of attention to digital devices.
   (c) The habit of always glancing at one's digital devices.
   (d) The visual mechanism for digital emotion contagion.
   (e) The inability to recognize non-verbal emotion behaviours due to prolonged device use.

Question 21

[1 mark] Which of the following is NOT a symptom of Repetitive Strain Injury (RSI)?

(a) Muscle tightness and spasms.
(b) Muscle pains.
(c) Numbness and tingling.
(d) Aches.
(e) Blurry vision.

Question 22

[1 mark] How much memory (in Kilobytes) would be required to store an image that has 256 different colours and is 50 pixels high by 20 pixels wide?

(a) 1 KB.
(b) 8 KB.
(c) 0.5 KB.
(d) 2 KB.
(e) None of the above.

Question 23

[1 mark] If a vector graphics image of resolution 320 pixels by 200 pixels requires 50 bytes of memory, how much memory would the same image require if it is resized so that it is 640 pixels by 400 pixels?

(a) 100 bytes.
(b) 150 bytes.
(c) 200 bytes.
(d) 50 bytes.
(e) None of the above.

Question 24

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

I.   Tommy Flowers developed the Bombe to decode Enigma messages.
II.   Alan Turing developed the Colossus to decode Lorenz messages.
III. The Harvard Mark 1 was used to calculate artillery tables for the US military.
IV. Herman Hollerith designed the Electric Tabulating System to compile the 1890 US census results.
V. Charles Babbage designed the Analytical Engine.

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

Question 25
[1 mark] Consider the following computers:

I.   IBM 701
II. Altair 8800
III. Apple Macintosh
IV. IBM 1620
V. Apple iMac

Which of the following options lists them in correct chronological order based on their released date, from earliest to most recent.

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

Question 26
[1 mark] Which of the following statements are TRUE?

I.   Virtual Reality adds computer generated input to real world environments.
II. Augmented Reality immerses users in a computer generated environment.
III. eSports is the term used to describe organized video game competitions.
IV. The video game industry has had issues with censorship and regulation.
V. Playing video games has been linked to negative behavioural effects.

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

Question 27
[1 mark] Which of the following is NOT a business model used by the video game industry?

(a) Subscription games.
(b) Free-to-play games.
(c) Microtransactions.
(d) Packaged games.
(e) They are all examples of business models used by the video game industry.

Question 28
[1 mark] Which of the following statements is FALSE?

    (a) AI research has been used to develop a greater insight into human cognition.
    (b) Machine learning is an area of AI research.
    (c) With the cognitive view of intelligence, the underlying process behind the intelligent behaviour is also important.
    (d) Autonomic activity like breathing is considered to be intelligent behaviour.
    (e) With the functionalist view of intelligence, if an entity behaves intelligently it is intelligent.

Question 29
[1 mark] Which of the following is NOT an example of weak AI?

    (a) MYCIN.
    (b) The NASA Curiosity Rover.
    (c) The Terminator T100.
    (d) IBM Deep Blue.
    (e) They are all examples of weak AI.

Question 30
[1 mark] In lectures we discussed a symbolic representation of a simple problem. The problem in question involves a farmer who needs to cross a river by boat taking with him his dog (d), goose (g) and sack of corn (c). The farmer and his belongings start on the left bank of the river (`L(d, g, c), R()`) and the goal is for him to cross to the right bank of the river with his belongings (`L(), R(d, g, c)`). The farmer can only take one item along with him on the boat (`->()` for taking an item to the right bank and `<-()` for taking an item to the left bank). The dog can't be left alone with the goose as it will eat the goose and the goose can't be left alone with the corn as it will eat the corn. Given these constraints and the start state above, what action should the farmer first take?

    (a) `->(d)`
    (b) `<-(g)`
    (c) `->(c)`
    (d) `->(g)`
    (e) `<-(d)`

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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 statement that divides 26 by 5 and puts the result as an integer into a variable called "**result**".

(2 marks)

(b) What is the smallest possible number and what is the largest possible number which can be printed by the following code?

```
import random
result1 = random.randint(3, 10)
result2 = random.randint(5, 35)
print(result1 + result2)
```

Smallest possible number: ____   Largest possible number: ____

(2 marks)

(c) What is the output of the following program?

```
number = 5
counter = 2
while number < 10:
    number = number + counter
    print(number, '+', counter)
    counter = counter + 1
```
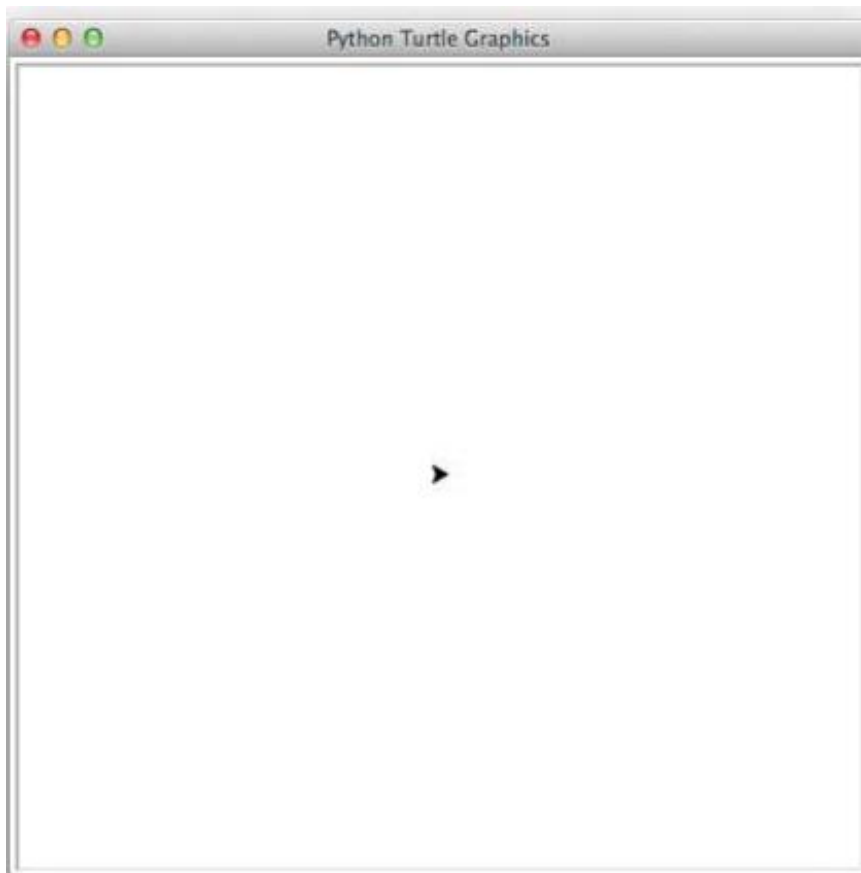
(2 marks)

(d) Using the space provided below, draw the output produced by the Python 'turtle' program listed below. Assume that the turtle begins in the middle of the window facing right and that the window is approximately 600 steps wide.

Make sure to clearly indicate:

- the path drawn by the turtle.
- the final position and direction of the turtle (using the arrowhead).

```python
import turtle

steps = 100
angle = 135
sides = 0
end = 5
longer_steps = 144

while sides < end:
    if (sides%2 == 1):
        turtle.forward(longer_steps)
    else:
        turtle.forward(steps)
    turtle.right(angle)
    sides = sides + 1
```


(4 marks)

32. Spreadsheets (15 marks)

The following spreadsheet displays information about product sales in a small company.

	A	B	C	D	E	F	G	H	I	J
1		Products			Order:	1201				
2	ProductID	Price	Name		Customer:	1002				
3	82983	$34.00	Anique Table Lamp		Quantity	Product Code	Product Name	Unit Price	Total Price	Net Price
4	6209	$902.00	72 Piece China Set		11	7404	Batman suit	$208.00	$2,288.00	$2,059.20
5	127	$82.00	Luke Skywalker Toy		5	127	Luke Skywalker Toy	$82.00	$410.00	$410.00
6	90222	$199.00	Encyclopedia Set		2	6209	72 Piece China Set	$902.00	$1,804.00	$1,804.00
7	7404	$208.00	Batman suit							
8										
9		Customers							Sub-total:	$4,273.20
10	CustomerID	Name	Discount %						Discount %	5%
11	1001	Mark	10%						Total:	$4,059.54
12	1002	Sally	5%							
13	1003	Jarvis	5%							

(a) Columns E to J contain a customer's order. What is the best formula to use in Cell **H4** to find the unit price of the product ordered? The price table is located in Cells **A3 : B7**. Your answer must use a **VLOOKUP** function.

Note: Your formula must be able to be filled down from **H4** to **H6** correctly.

=VLOOKUP (_____ , _____ , _____ , _____)

(5 marks)

(b) Cell **E4** indicates the quantity ordered by a customer. What is the best formula to use in Cell **I4** to calculate the total price for the order item?

Note: Your formula must be able to be filled down from **I4** to **I6** correctly.

=

(2 marks)

(c) Cell **J4** indicates the net price which is calculated by applying a discount of 10% if the quantity is over 10. Your answer must use an **IF** function. What is the best formula to use in Cell **J4** to calculate it?

Note: Your formula must be able to be filled down from **J4** to **J6** correctly.

=IF(_____ **,** _____ **,** _____**)**

(3 marks)

(d) Cell **J10** indicates a special discount based on who the customer is. What is the best formula to use in Cell **J10** to find the special discount? The Customer table is located in Cells **A11 : C13**. Your answer must use a **VLOOKUP** function. The customer ID is located in Cell **F2**.

=VLOOKUP(_____ **,** _____ **,** _____ **,** _____**)**

(5 marks)

33. Databases (15 marks)

A school is organizing a fundraising movie night. Students, their parents and friends can come along and watch movies in the school hall. The following tables are from the school's database:

Customers

ID	CustomerName
⊞ DDAV001	Dominic Davidson
⊞ JWAL001	Janet Walker
⊞ MCHA001	Mark Chan
⊞ SKIM001	Sally Kim

Orders

ID	CustomerID	TicketID	Num
1	JWAL001	STUDENT	13
2	SKIM001	STAFF	2
3	MCHA001	STUDENT	11
4	MCHA001	VIP	4
5	DDAV001	VIP	3

Tickets

Type	Price
⊞ STAFF	$11.00
⊞ STUDENT	$9.00
⊞ VIP	$20.00

(a) State the **primary** key of the **Tickets** table.

Primary Key:

(1 mark)

(b) State the **primary** key and **foreign** key(s) of the **Orders** table.

Primary Key:

Foreign Key(s):

(3 marks)

(c) In the space below, draw the relationship diagram for the school's database, indicating the relationships between tables.

(5 marks)

(d) Show the output of the following query:

Field:	CustomerID	Num
Table:	Orders	Orders
Total:	Group By	Sum
Sort:	Ascending	
Show:	☑	☑
Criteria:		
or:		

(2 marks)

(e) In the space below, write an SQL query that displays the **CustomerID** and the **Type of tickets** in the **ORDERS** table where the **number of tickets** is more than **10**. The details are to be displayed in descending order based on **CustomerID**. An example of the results obtained by running the query is shown below.

CustomerID	TicketID
MCHA001	STUDENT
JWAL001	STUDENT

(4 marks)

34. HTML5 and CSS (15 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 the Wikipedia entry on diving watches is: "https://en.wikipedia.org/wiki/Diving_watch".

(2) The image is stored in a file called **"Watch.png"** in the same folder as the HTML file.

(3) There are two sections ("Characteristics" section and "Water Resistance" 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}
  .characteristics{font-style:italic; font-weight:bold}
  .resistance{text-align:center; font-weight:bold}
</style>
</head>
```

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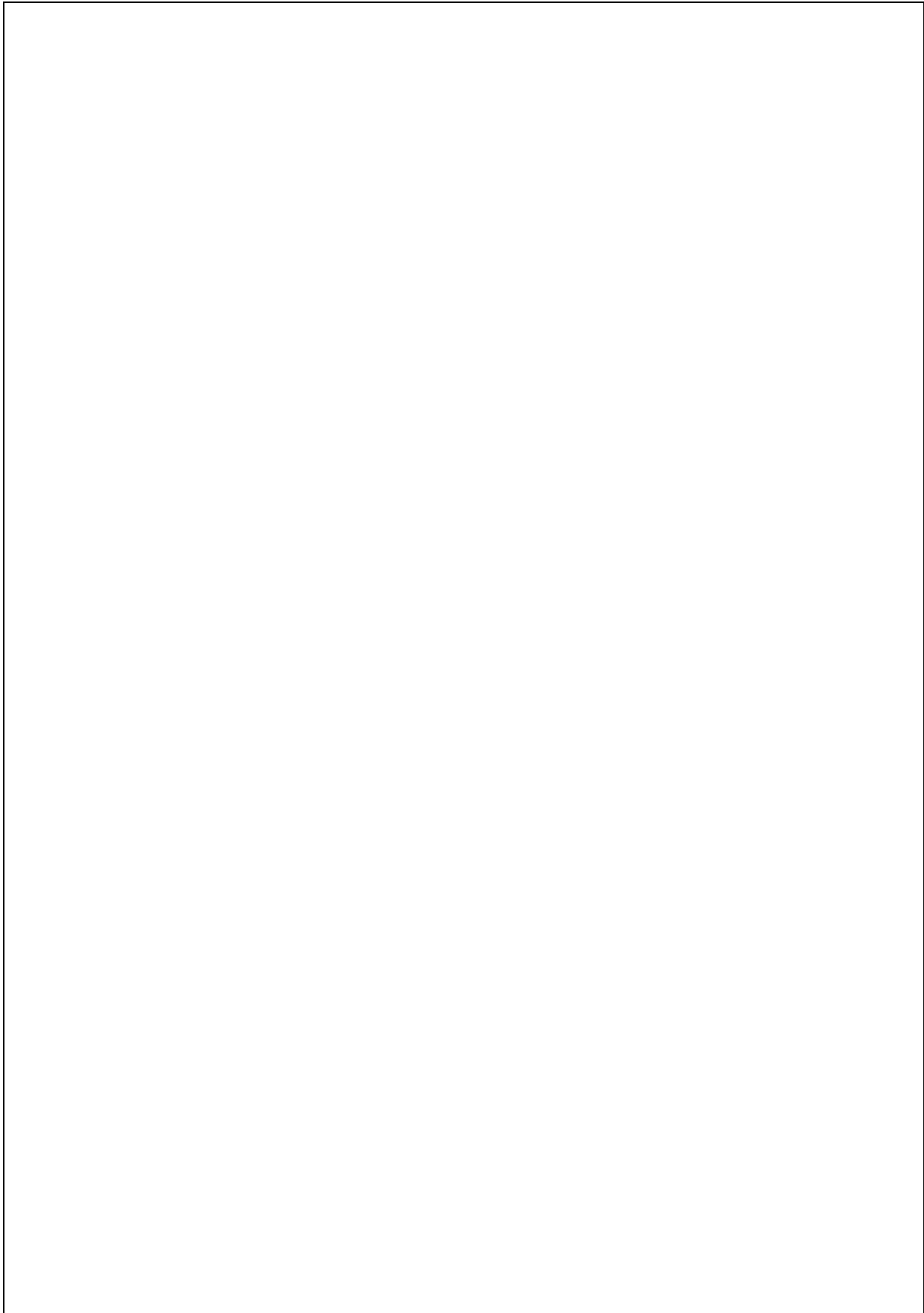
<!-- Main Heading -->

(1 mark)

<!-- First Paragraph -->

(4 marks)

<!-- "Characteristics" Section -->

(5 marks)

<!-- "Water Resistance" Section -->

(5 marks)

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

35. LaTeX (15 marks)

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

The images are stored in files called **icon.png** and **violin.jpg** and are in the same folder as the LaTeX code. When inserted into the document, both images should be **centred.** The icon image should be **3 cm wide** and the violin image should be **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`	`\%`
`\author{}`	`center`	`\ldots`
`\date{}`	`quote`	`\sum_{}^{}`
`\maketitle`	`displaymath`	`\infty`
`\item`	`equation`	`\int`
`\emph{}`	`quotation`	`^`
`\ldots`		
`\includegraphics{}`		`_`
`\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