COMPUTER APPLICATIONS TECHNOLOGY: PAPER I

Time: 3 hours   150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1.   This question paper consists of 15 pages. Please check that your question paper is complete.

2.   The paper is divided into Section A (25 marks), Section B (75 marks) and Section C (50 marks).

3.   Answer ALL the questions.

4.   Number your answers exactly as they appear in the question paper.

5.   Non-programmable calculators may be used.

6.   It is in your own interest to write legibly and to present your work neatly.

7.   Read the questions carefully. Take note of the wording of the questions, i.e. explain, name, select, discuss, identify, etc. and then answer accordingly.

8.   Give your answers in general terms. Use brand names only when asked, e.g. use 'word processing' rather than 'Microsoft Word' or 'WordPerfect'.

9.   In general, a mark is allocated per fact. Therefore, a two-mark question would require two facts, and so on.

SECTION A

QUESTION 1

1.1   Choose the correct word(s) in Column B which **BEST** describes the definition in Column A. Write down **ONLY** the word(s) of your choice next to each question number.

Question Number	Column A	Column B	
1.1.1	Computers connected to the Internet that have been compromised and can be used to perform malicious tasks under remote direction.	Spoofed computers GPS	(1)
1.1.2	A network of private computers infected with malicious software and controlled as a group without the owners' knowledge, e.g. to send spam messages.	DoS GPRS Anti-spam	(1)
1.1.3	A global satellite navigation system that provides geolocation and time information to a receiver in all weather conditions, anywhere on or near the Earth.	BotNet Anti-Spyware	(1)
1.1.4	This is used to prevent unsolicited bulk e-mail.	Meme	(1)
1.1.5	An idea, behaviour, or style that spreads from person to person within a culture, usually electronically.	Virus Zombie computers	(1)

1.2   Give the most appropriate definition of the following terms:

1.2.1   GIGO   (2)

1.2.2   Hotspot   (2)

1.2.3   Heatsink   (2)

1.2.4   'Hot' swapping   (2)

1.2.5   Domain   (2)

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QUESTION 2

Select the **MOST** appropriate answer to each question. Write down **ONLY** the letter of your choice next to each question number.

2.1   Which **ONE** of these is an output device?

      A   Scanner
      B   Microphone
      C   Speaker
      D   Mouse

2.2   In an application a document can be printed by clicking on a picture like the one shown below.

      The name given to a picture used in this way is a(n)

      A   image.
      B   icon.
      C   photograph.
      D   pointer.

2.3   Sipho receives an amusing e-mail and so he sends it on to his friend, Bob. This is called

      A   copying.
      B   forwarding.
      C   attaching.
      D   formatting.

2.4   Parents can use software to protect their children from accessing Internet sites that they deem inappropriate to view. This type of software is called

      A   anti-virus software.
      B   a firewall.
      C   filtering software.
      D   an Internet browser.

2.5   When using a modern credit/debit card to pay for goods at a shop, where is the customer's electronic data stored?

      A   On the microchip
      B   In the printed name
      C   In the hologram
      D   In the printed number

2.6   Which one of the following devices has the greatest storage capacity?

    A   1 GB DDR RAM
    B   1 kB L1 cache
    C   1 TB SSD
    D   1 MB L3 cache

2.7   What are the **FOUR** key parts into which a computer system is divided?

    A   Keyboard, display, memory and disk drive
    B   Word processing, spreadsheets, databases and presentations
    C   Bits, bytes, words and hertz
    D   Input, processing, output and storage

2.8   What are the gold inlaid wires on the motherboard, used for transferring data, called?

    A   Buses
    B   RAM
    C   Keys
    D   Nodes

2.9   The action of switching on and starting a computer is called

    A   loading.
    B   opening.
    C   POST.
    D   booting.

2.10   The type of computer used to forecast weather and predict climate change/ global warming on Earth.

    A   Laptop computer
    B   Main frame computer
    C   Super computer
    D   Tablet computer

[10]

25 marks

SECTION B

QUESTION 3   SYSTEM TECHNOLOGIES

3.1   In **Figure 1** you are given photographs of different devices that could be connected in or to a typical computer.

Figure 1

Draw the following table in your Answer Book. Then write in the name of each of the devices in the second column and their **MAIN** function in the third column. Note: when filling in the function, think of what makes that particular device unique.

Question Number	Name of Device	Main Function
3.1.1		
3.1.2		
3.1.3		
3.1.4		
3.1.5		

(10)

3.2   A modern CPU (Central Processing Unit) is the most important part of a computer and can be classified as Dual Core or Quad Core.

      3.2.1   Name the **THREE** standard parts into which all CPUs can be divided. *(You may not use abbreviations.)* (3)

      3.2.2   Explain the terms **Dual Core** and **Quad Core.** (2)

      3.2.3   What is the difference between **multitasking** and **multiprocessing**? (4)

3.3   **Cache Memory** aids the CPU in speeding up the processing of the computer.

      3.3.1   Explain how **cache memory** speeds up this processing. (2)

      3.3.2   Give **TWO** examples of where cache memory can be found. (2)

3.4   Whenever the CPU has insufficient memory for some of the applications that need to be run on the computer, the CPU also has access to **Virtual Memory**. What is **Virtual Memory**? Your answer should explain how **Virtual Memory** works. (4)

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QUESTION 4   INTERNET AND NETWORK TECHNOLOGIES

Bootiful, an international shoe shop chain, has just opened its first store in Johannesburg and sets up a network with the following topology (layout shown in **Figure 2**). The network connects three POS (Point of Sales) terminals, the manager's workstation, her secretary's workstation and a terminal for customers to access general information about the shoes sold in the store.
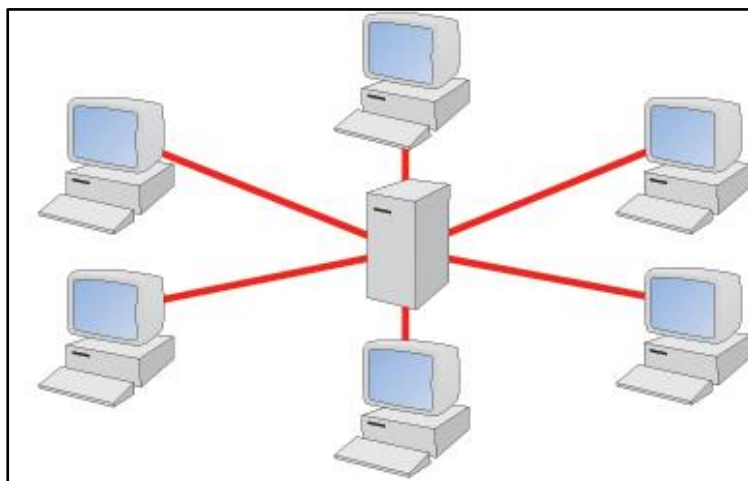

Figure 2

4.1   Name the type of network topology shown in **Figure 2**.   (1)

4.2   You are required to motivate why the topology shown in **Figure 2** was chosen.

      4.2.1   State **TWO** advantages of the network topology used by **Bootiful**.   (2)

      4.2.2   State **TWO** disadvantages of the network topology used by **Bootiful**.   (2)

4.3   Complete each sentence below using one item from the following list:

      bridge, hub, modem, proxy server, switch, Wi-Fi router

      4.3.1   A ... does not manage any of the data traffic passing through it.   (1)

      4.3.2   A ... forwards data to the correct segment of the network.   (1)

The IT manager of **Bootiful** Head Office has decided to join all its computers into an intranet.

4.4   4.4.1   What is an intranet?   (2)

      4.4.2   What would **ONE** benefit be of having an intranet for Head Office?   (1)

4.5   The CEO at Head Office is told that she will need a modem to connect their network to the Internet via a fibre connection.

      Why is this statement **INCORRECT** and what should she have been told?   (3)

4.6   Name **TWO** pieces of information the workers need to enter into their computer in order to gain access to the network.   (2)

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QUESTION 5   INFORMATION MANAGEMENT

OR Tambo International Airport in Johannesburg is the busiest airport in Africa. On average one flight takes off or lands every 25 seconds. This has led to noise, air pollution levels and daily temperatures increasing around the airport. Researchers from the CSIR have been monitoring these noise, pollution and temperature levels, specifically the pollutant gases, nitrogen dioxide (NO_2) and carbon dioxide (CO_2). Monitoring devices have been placed around the boundary of the airport.

5.1   Name **ONE** suitable device that can be used to collect input data that measures each of the following quantities:

      5.1.1   Noise level   (1)

      5.1.2   Air pollution level   (1)

      5.1.3   Temperature   (1)

5.2   Data from the monitoring devices are saved on solid-state memory. The memory is housed in a secure location at the airport's IT department. Each month, the data stored on this solid-state memory is transferred to the researchers' computers at the CSIR. State **TWO** ways in which the data could be transferred.   (2)

5.3   Once the data has been stored on the researchers' computers at the CSIR, state **TWO** questions that could be answered by the data collected.   (2)

5.4   Give **TWO** types of commercially available software that would be suitable to process the data. (**NO BRAND NAMES**).   (2)

5.5   Describe **TWO** ways in which the processed data could be used to show changes in both noise levels and air pollution levels from month to month and also long-term trends.   (2)

5.6   Based on the information obtained, give **ONE** recommendation to improve the noise levels, temperature levels or air pollution levels that can be made to the airport authorities.   (1)

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QUESTION 6   SOCIAL IMPLICATIONS

6.1   ICT (Information and Communications Technology) is becoming more and more part of our daily lives and the South African government is making increasing use of it to get services closer to the people.

      6.1.1   Give **TWO** ways in which the development of ICT has influenced the way the S.A. government operates. You must give the advancement, development, or improvement that has taken place first and then give the effect that it has had on the S.A. government.   (4)

      6.1.2   Nevertheless, this can also lead to the S.A. government's invasion of its citizens' privacy. If you were the President of South Africa, give **TWO** laws you would implement to protect the privacy of the South African people.   (2)

6.2   Describe **TWO** ways in which the development of ICT in South Africa has benefitted the way businesses operate.   (2)

[8]

QUESTION 7   SOLUTION DEVELOPMENT

Dr RedLiquid, the Physical Sciences educator at Forward High School, has used a spreadsheet to calculate the speeds of a stone as it is dropped out of lab windows at five different heights above the ground. It is based on the formula:

$$v^2 = u^2 + 2gs$$

where: v = final speed, in $m \cdot s^{-1}$
u = starting speed, in $m \cdot s^{-1}$
g = the acceleration due to gravity, in $m \cdot s^{-2}$
s = the height dropped, in m

	A	B	C	D
	Value of u	Value of g	Value of s	Result v
1				
2	5	9.8	3	
3	10	9.8	15	
4	12	9.8	18	
5	8	9.8	10	
6	14	9.8	21	

7.1   Gil entered = (D2*D2 + 2 * B2 * C2) into cell D2. Why would this formula produce an **INCORRECT** answer?   (1)

7.2   What is the **CORRECT** formula that should have been entered in cell D2?   (3)

7.3   If this formula was autofilled down to cell D6, what formula would be in D6?   (3)

7.4   What formula should be entered in cell D7 to find the second highest value of v?   (3)

7.5   Column B has the same value throughout, i.e. 9.8. If Column B was removed, what would the new formula in C2 (previously D2) have to be to get the same result as before?   (1)

7.6   In order to save time and avoid unnecessary errors, the constant value in Column B could be entered in a single cell, say E1. What would the formula then entered into cell D2 be changed to, assuming that this formula will be autofilled down the column to D6?   (1)

7.7   What is the technique of using a constant value of a single, non-changing cell called?   (1)

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75 marks

SECTION C

Star Trek Anniversary Movie Productions (Pty) Ltd

[<http://www.startrek.com/uploads/assets/articles/9a5570aa205c967c350c52e4ad43bc8ab6fdecd0.png>]

Millions of viewers around the world were devastated when on 13 May 2005 the very last new episode of a *Star Trek* series, *Enterprise*, aired on television. 2017 is the 51st Anniversary of the first broadcast of the *Star Trek* series and you, being an avid *Star Trek* fan (Trekker) yourself, decide to set up a video production company at your home. You want to produce new episodes of *Star Trek* for web-based streaming and sales, to satisfy Trekkers who have so sorely missed 'Boldly going where no-one has gone before'.

QUESTION 8   INTEGRATED SCENARIO

8.1   You research on the Internet and come across a wonderful site at www.startrek.com. There are many photos and drawings of the Star Trek Universe and knowing that you will need all of these images, you begin to download the resources. Your mom, an entertainment lawyer, sees what you are doing and is concerned that you are breaking the law.

      8.1.1 Why is it illegal to download these images and use them in your commercial videos?   (2)

      8.1.2 What must you do so that you can legally use these images?   (2)

8.2   Your mom agrees that you can use the empty storage shed in the backyard as your studio and loans you R50 000 to set up the production unit. You will need to purchase the following:

- A device capable of taking video images for production of the video
- A sound recording device
- Storage devices for saving the raw footage of your videos
- Props and costumes
- Lighting devices

- A device for post-production of the videos. This device will need to be able to do the following:
  - Graphically edit the raw footage and images and adjust the quality of the images.
  - Add sound and music and adjust the quality of the sound.
  - Produce CGI and special effects as needed and add to the footage.
  - Add any special effects as needed such as opening and closing title sequences.
  - Set up a database of information of actors available for hire. Note: the maximum amount you can afford to pay any actor is R1 000.
  - Control your limited budget using a spreadsheet program.
  - Set up a website for the selling and streaming of the produced episodes.

You see the following adverts for **TWO** computer systems, online at <www.bestcomputerbuys.com>.

SYSTEM A	SYSTEM B
Hewlett-Packard-Z1-G2 Desktop	**Apple iMac ME088LL/A 27-Inch Desktop**
• Intel Core i5 I5-4590 3.30 GHz Quad • 8 GB RAM (1200 MHz DDR3) • 1 TB HDD • DVD writer • Intel built-in HD Graphics 4600 • 27" Flat screen – tilt back • Standard keyboard • Wireless mouse • Windows 10 Professional	• Intel Core i5 – 3.4 GHz Quad • 16 GB RAM (1600 MHz DDR3) • 1 TB HDD • DVD Writer • NVIDIA Card with a GeForce GT 755M Graphics Processor and 1 GB of DDR3 Memory • 27" Flat screen • Standard keyboard • Wireless mouse • Mac OS X Yosemite
R19 800	**R21 600**

Figure 3

8.2.1 Which one of the computer systems shown in **Figure 3** will you purchase, System A or System B? Base your choice on your requirements and budget. (1)

8.2.2 Give **THREE** reasons in support of your choice in **8.2.1**. (3)

8.2.3 Name **ONE** additional piece of hardware needed that is not part of the systems in **Figure 3**. (1)

8.3 A dedicated video camera costs around R19 000, which will use up much of your budget, so you need to consider other options.

8.3.1 Name **ONE** hardware device that you could purchase to use in place of a dedicated video camera. (1)

8.3.2 Give **TWO** specifications you need to consider when purchasing the device in **8.3.1**. (2)

8.4 A typical video episode will need around 2 GB of storage space. Recommend **ONE** device that you would purchase to store the 16 completed episodes. (1)

8.5 You will also need video editing software for post-production.

8.5.1 Give a brand name of **ONE** video editing software program that would be suitable for your use. (1)

8.5.2 Give a brand name of **ONE** video viewing software program that would be suitable for watching your episodes. (1)

8.6 You set up a database containing all the details of the actors who have applied for roles in your videos. Some of the information stored in the database consists of the following fields. Copy the table into your Answer Book and then complete the missing data types. You are also required to suggest a possible validation rule for capturing the data in each of the fields.

Question Number	Field Name	Data Type	Validation Rule	
8.6.1	Gender			(2)
8.6.2	Previous Acting Experience			(2)
8.6.3	Salary			(2)

8.7 You spend many hours in front of your computer system working on your episodes and find that after a few hours, you don't feel very well.

8.7.1 Name **TWO** types of injuries you may have sustained from prolonged computer use. (2)

8.7.2 For each of the injuries named in **8.7.1**, give a way of preventing such an injury. (2)

8.8   You decide to hold a launch party to advertise your video episodes to prospective buyers.

    8.8.1   Give **TWO** ways, other than bulk e-mailing, by which you can advertise your product, to make people aware of the upcoming launch party. (2)

    8.8.2   Someone who received an invitation to your launch party sends you a rude e-mail saying that they find *Star Trek* horrible and they keep sending the e-mail to you continuously. What term is used to describe this practice? (1)

8.9   The production and post-production computer system has been running for a while but now some problems have arisen that need to be fixed.

    8.9.1   The computer system is running far slower than when you first started.

    8.9.2   The computer system keeps restarting.

    8.9.3   The computer system will not switch on at all.

    8.9.4   Your video episodes are not displaying correctly and you keep seeing the images break up into pixels.

    8.9.5   The sound for your videos can no longer be heard.

For each of the above problems, you are required to identify a possible cause and then give a possible solution. Copy the following table into your Answer Book in order to answer this.

Question Number	Possible Cause	Possible Solution	
8.9.1			(2)
8.9.2			(2)
8.9.3			(2)
8.9.4			(2)
8.9.5			(2)

8.10   The series of 'The New Adventures of Star Trek' is complete and you want to set up a website so that buyers can purchase episodes. You offer two formats for obtaining the videos, namely **direct download** or **video streaming**.

    Explain the terms:

    8.10.1 direct download (2)

    8.10.2 video streaming (2)

8.11   You choose an ISP to host your website.

        8.11.1 What does ISP stand for?   (1)

        8.11.2 Give **TWO** services, other than web hosting and Internet connection, that an ISP offers.   (2)

8.12   Some of the buyers inform you that when they purchase a video from you, they are not comfortable sending their credit card details to you. You inform them that the data will be encrypted.

        8.12.1 What does encryption mean?   (2)

        8.12.2 Why is encryption useful?   (2)

        8.12.3 Give **ONE** way that users of your website can be assured that their data is encrypted.   (1)

<div align="right">

50 marks

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Total: 150 marks

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