COMPUTER APPLICATIONS TECHNOLOGY: PAPER I

Time: 3 hours   150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1.   This question paper consists of 14 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 of your choice next to each question number.

Column A	Column B
1.1.1 The part of the World Wide Web that is only accessible by means of special software, allowing users and website operators to remain anonymous or untraceable and make illegal transactions.	eSports
	Dark Web
	Broadband
1.1.2 A multiplayer video game played competitively for spectators, typically by professional gamers.	Trojan
1.1.3 The messages or signals transmitted through a communications system.	RPGs
1.1.4 A malware program that "mines" your computer for confidential information.	Web 3.0
1.1.5 A central place where data is stored and maintained.	Repository
	Traffic
	Worm
	Node

(5)

1.2 Give the most appropriate definition of the following terms.

    1.2.1 Logic Bomb

    1.2.2 LTE

    1.2.3 Virtual Machine

    1.2.4 Bandwidth Hog

    1.2.5 Piconet

(10)

[15]

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   An optical mouse operates by

A   using a ball and rollers.
B   using a laser.
C   using a red LED.
D   using a stylus nib.

2.2   The process of a computer receiving information from a server on the Internet is known as

A   pulling.
B   uploading.
C   downloading.
D   transferring.

2.3   The method of communication in which transactions take place in both directions, but only in one direction at a time, is called

A   simplex.
B   asynchronous.
C   full duplex.
D   half-duplex.

2.4   The acronym **RAM** stands for

A   random access memory.
B   read access memory.
C   read arithmetic memory.
D   random arithmetic memory.

2.5   The L1 cache memory is located

A   on the motherboard between the CPU and RAM.
B   on the CPU die but outside the CPU circuitry.
C   on the motherboard between the CPU and ROM.
D   on the CPU die and inside the CPU circuitry.

2.6   Loss in signal power as light travels down a fibre optic cable is called

A   attenuation.
B   propagation.
C   scattering.
D   interruption.

2.7   HTML is used to

    A   plot complicated graphs.
    B   solve equations.
    C   author web pages.
    D   translate one language into another.

2.8   Google (www.google.com) is a

    A   number in Mathematics.
    B   chat service on the web.
    C   directory of images.
    D   search engine.

2.9   The speed of your network access is usually expressed in terms of

    A   MHz.
    B   MB.
    C   TB.
    D   Mbps.

2.10   What is the name given to the temporary storage area that a web browser
       uses to store pages and graphics that it has recently opened?

    A   Cache
    B   Niche
    C   Buffer
    D   Webspace

[10]

25 marks

SECTION B

QUESTION 3   SYSTEM TECHNOLOGIES

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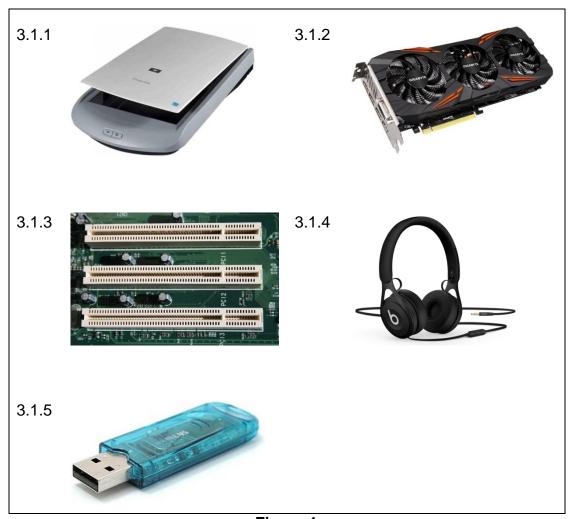

Figure 1

Draw the following table in your Answer Book. You are then required to 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 Computers have two main types of hardware used to store data and/or information.

    3.2.1 Name the **TWO** main **TYPES** of hardware storage. (2)

    3.2.2 Give **TWO** differences between the two main types of hardware storage you named in **Question 3.2.1**. (4)

3.3 Keyboards can be classified as standard or ergonomic.

    3.3.1 What is meant by, and give an example of, the term an **ergonomic** keyboard? (2)

    3.3.2 Give **TWO** examples of standard keyboard layouts. (2)

3.4 South Africa is prone to power failures, surges and outages and this can have an effect on your computer systems.

    3.4.1 Give **ONE** problem that a power outage can cause to your computer. (1)

    3.4.2 Give **TWO** hardware solutions that you can use, to avoid the problem given in **Question 3.4.1**. (2)

3.5 Data can move through the computer circuitry either as a parallel transfer or a serial transfer.

    3.5.1 Explain the following terms:

        (a) Parallel data transfer (1)

        (b) Serial data transfer (1)

    3.5.2 Give **ONE** advantage each of:

        (a) Parallel data transfer (1)

        (b) Serial data transfer (1)

[27]

QUESTION 4   INTERNET AND NETWORK TECHNOLOGIES

4.1   The majority of users in South Africa (and Africa) today, access the Internet using their mobile devices.

   4.1.1   Give **TWO** benefits of accessing the Internet via a cell phone or smart phone rather than via a PC connection.   (2)

   4.1.2   Give **TWO** disadvantages of accessing the Internet via a cell phone or smart phone rather than via a PC connection.   (2)

4.2   EdLabSchools is a large education company operating campuses on two separate sites. Each of these campuses has their own LAN. The CEO of EdLabSchools has decided to form a single network using the existing LANs to form a WAN.

   4.2.1   Give the definition of a LAN.   (2)

   4.2.2   Give the definition of a WAN.   (2)

   4.2.3   Other than a router, name **THREE** network devices that could be found within a single LAN.   (3)

   4.2.4   The IT Administrator connects the LANs together using a router. Other than connecting the LANs, give **TWO** other functions that this router has.   (2)

4.3   The principals of universities in South Africa are worried that confidential information about their students may not be protected. Name **AND** describe **ONE** authentication technique that can be set up by the IT Administrator to protect and prevent unauthorised access to the university network.   (2)

[15]

QUESTION 5   INFORMATION MANAGEMENT

Johannesburg Parks and Recreation is trying to get learners excited about classical music. They have many old and donated classical CDs and DVDs in storage. These disks need to be cleaned, collated, catalogued and packed on shelves in the new music centre. The administrator has decided to set up a computer program to keep track of all the items in the centre.

5.1   Give **THREE** important pieces of data that will be needed for each CD/DVD to be catalogued.   (3)

5.2   Once all the data has been collated and catalogued, give **THREE** processes or queries that can be done with the data.   (3)

5.3   5.3.1 Give the definition of an *algorithm.*   (3)

        5.3.2 Into what **THREE** parts is an algorithm divided?   (3)

                                                                                          [12]

QUESTION 6   SOCIAL IMPLICATIONS

6.1   To coincide with the launch of the new Star Trek series – Discovery, Electronic Arts (EA) have published a gaming version of the series. You have legally purchased a copy of the new game and your friend Bif asks you to make a copy for him to use, for which he will pay. Explain to Bif why you cannot do this.   (2)

6.2   EA allows its users to download the game directly onto their own device. Give **TWO** advantages to EA of allowing its customers to download the game.   (2)

6.3   Explain **TWO** environmental benefits of downloading games rather than buying them on disk.   (2)

6.4   How does the use of digital devices for long-term gaming impact on people's health and wellbeing

        6.4.1 negatively?   (1)

        6.4.2 positively?   (1)

                                                                                          [8]

QUESTION 7   SOLUTION DEVELOPMENT

BippityBoppity School library uses a database comprising of two tables, one to store details of the books it has in stock and the other to store details of the learners that have borrowed books. The two tables are linked using a common field. A representative part of each table is shown below, in **Figure 2**.

tblBook

Code	Title	Author	Published	NumberInStock	Cost
1857028898	So Long and Thanks for all the Fish	Douglas Adams	1984	2	R10.99
0747591054	The Deathly Hallows	J K Rowling	2007	8	R17.99
0748791167	Foundation	Isaac Asimov	1951	3	R18.99
0563371218	The Belgariad	David Eddings	1993	1	R19.99

tblLearners

Number	Name	Grade	BookLoaned	CheckedOut	DueDate
1147	Jeff Archer	9	0747591054	2018/03/05	2018/03/11
1775	James Kirk	10	1857028898	2018/03/09	2018/03/17
1219	Kate Janeway	10	0563371218	2018/04/01	2018/04/08
1319	JL Picard	12	0748791167	2018/03/11	2018/03/20
1888	Ben Sisco	11	0747591054	2018/03/08	2018/03/16

Figure 2

7.1   Suggest an alternative way of entering the data instead of in table format. (1)

7.2   What type of database do these two tables form? (1)

7.3   Give **TWO** reasons why the type of database system you gave as an answer to **Question 7.2** is used rather than having two separate databases. (2)

7.4   Which field in the **tblBook** table is the *linking field*? (1)

7.5   Which field in the **tblLearners** table is the *foreign key*? (1)

7.6   Which field in the **tblBook** table has the data type *currency*? (1)

7.7   What data type would be most appropriate for the CheckedOut field in the **tblLearners** table? (1)

7.8   What would one use to ensure that data entered in a particular field is entered according to a specific format? (1)

7.9   Give an appropriate example using what you suggested in **Question 7.8** for the CheckedOut field in the **tblLearners** table. (2)

7.10   What would the criteria be for a query that lists all the books in the **tblBook** table that were published after 1990? (2)

[13]

75 marks

SECTION C

Katlego is the Chairperson of the Outreach Programme at General Academy High School. Her committee consists of four other members: Thuli, Menachem, Jane and Mohammad. Their major fundraiser this year is planned to be a gaming evening tournament. Each participant will be charged an entrance fee to play in the tournament. Food and drinks will be sold during the event.

QUESTION 8   INTEGRATED SCENARIO

Katlego wants to buy a new console for the tournament. An electronics store offers the following **THREE** choices to Katlego for the evening.

OPTION A Microsoft Xbox 360	OPTION B Sony Playstation 3	OPTION C Nintendo Wii
[Source: <https://upload. wikimedia.org/wikipedia/ commons/6/67/Microsoft-Xbox-360-E-wController.jpg>]	[Source: <http://vignette1.wikia. nocookie.net/lego-dimensions/ images/4/40/PS3-slim-console.png/ revision/latest?cb=20150922210857>]	[Source: <https://upload. wikimedia.org/wikipedia/commons/4/4a/ Wii_U_Console_and_Gamepad.png>]

Use the specifications of the three options given in the table below to answer the questions that follow:

	Option A Xbox 360	Option B PlayStation 3	Option C Nintendo Wii
Pricing (Rand)			
Low-end model	R3 627 (Xbox 360 Arcade)	n/a	n/a
Mainstream model	R4 537 (Xbox 360)	R5 187 (PlayStation 3 40 GB)	R3 237
High-end model	R5 837 (Xbox 360 Elite)	R6 487 (PlayStation 3 80 GB)	n/a
Microprocessor			
Processor type	3.2 GHz PowerPC with 3 dual cores	3.2 GHz Cell processor with 7 single cores	729 MHz IBM Broadway processor with 5 execution units
Graphics processor			
GPU Type	ATI-based custom processor	NVIDIA-based RSX "Reality Synthesiser"	ATI Hollywood processor
Video RAM	Up to 512 MB GDDR3 system RAM (700 MHz) plus 10 MB embedded DRAM (eDRAM) frame buffer	256MB GDDR3 (700MHz)	24 MB of system RAM (486 MHz) plus 3 MB of embedded DRAM (eDRAM)
Native video resolutions	16:9 widescreen 720p, 1080i, 1080p (will downsample to standard definition)	480i, 480p, 720p, 1080i, 1080p (will downsample to standard definition)	853 x 480 (480p) in widescreen or 4:3 aspect ratio
HDMI output	Yes	Yes	No
System memory			
Main System RAM	512 MB GDDR3 RAM (700 MHz), shared with GPU	256 MB XDR RAM (3.2GHz)	64 MB GDDR3 RAM
Storage			
Optical drive	12X dual-layer DVD; HD DVD drive offered as an add-on (for movies only).	Blu-Ray	Proprietary optical drive
Included storage	Arcade: 256 MB Memory Unit (MU) Xbox 360: 20 GB removable hard drive Elite: 120 GB removable hard drive	40 GB or 80 GB replaceable hard drive.	512 MB of internal flash memory
External hard drive support	Yes, but limited to media playback only.	Yes	No
Memory card ports	2 Xbox 360 Memory Unit ports (64 MB or 512 MB).	PS3 80 GB: Memory Stick, SD, CompactFlash ports	1 SD card slot, 2 GameCube memory card ports.
USB 2.0 ports	3	PS3 40 GB: 2 PS3 80 GB: 4	2
Networking			
Ethernet	1 port (100 Mbs)	1 port (1 Gbps)	No; optional with USB-based add-on.
Wireless networking	No. 802.11g is optional on all models.	Bluetooth 2.0, Bluetooth controller interface, Wi-Fi.	Integrated Wi-Fi for networking and Internet access; Bluetooth 2.0 for controllers.
Controllers			
Number of supported controllers	4 wireless (plus 3 wired controllers via USB),	7 wireless and/or wired controllers	4 wireless Remote Controllers.
Compatibility			
Backwards Compatible	Yes	Yes	Yes

8.1   Most of the committee members have no idea which one of the options to choose. However, Menachem is a CAT learner so he is able to answer the following queries asked by the members.

      8.1.1   Which one of the consoles has the smallest on-board storage capacity? (1)

      8.1.2   Which one of the consoles allows controller-free gaming? (1)

      8.1.3   Give **TWO** reasons why **Option C** is suitable for mobile gaming. (2)

      8.1.4   A webcam is available as a peripheral device for the consoles. Name **TWO** other useful peripheral devices that are available for gaming consoles. (2)

      8.1.5   Give **TWO** ways of connecting peripheral devices to a gaming console. (2)

      8.1.6   Most modern gaming consoles are classified as *multi-functional devices*. What does this mean? (2)

      8.1.7   Many gaming consoles use wireless motion-sensitive controllers. Give **TWO** benefits of using this type of controller for the console and player. (2)

      8.1.8   Give **TWO** reasons why a motion-sensitive controller may not be suitable for someone with a physical disability. (2)

8.2   8.2.1   Which one of the consoles has the capability of displaying the highest resolution? (1)

      8.2.2   Which one of the consoles cannot be connected to High Definition monitors? (1)

8.3   Explain what it means that all devices/consoles are *Backwards Compatible*. (2)

8.4   One of the players plans to bring their Xbox 360 to the tournament but is concerned, as they think that they do not have Windows, Linux or Mac iOS installed on their device. Explain to them why this concern is unnecessary. (2)

8.5   The school secretary gives you a spreadsheet containing the names and email addresses of all the learners, so that you can send them an invitation to enter the tournament. You create an invitation that you want to personalise and send to each learner.

      8.5.1   Suggest an application that would be suitable for creating this invitation. (**Do not give a brand name.**) (1)

      8.5.2   It would be such a waste of your time to recreate the invitation for each email you send to the learners, so you use a function of the application chosen in **Question 8.5.1**. What is the name of this function? (1)

8.6 An area of concern for the parents at the school is the long hours that their children will spend continuously playing the same game.

    8.6.1 Name **TWO** negative health effects players may experience during the tournament. (2)

    8.6.2 Suggest a way to the learners to alleviate **EACH** of the negative health effects named in **Question 8.6.1**. (2)

8.7 You set up a database containing all the details of the learners who have entered the tournament. Some of the fields in the player table are given below. Copy the table into your answer book and then complete the missing data types. You are also required to suggest a possible method to restrict the data in each of the fields.

	Field Name	Data Type	Data Restriction Method	
8.7.1	SchoolGrade			(2)
8.7.2	ConsoleType			(2)
8.7.3	FeePaid?			(2)

    8.7.4 What is the collection of fields making up each player, in most database programs, called? (1)

    8.7.5 Define what a primary key of a table in a database is. (2)

    8.7.6 Suggest a possible primary key for the player table, assuming that it is made up of the following fields:

FirstName	Surname	SchoolGrade	ConsoleType	FeePaid	email	LearnerId

(1)

8.8 Menachem has been appointed the treasurer for the tournament. He is required to set up a budget and balance sheet for the evening. Suggest an application program he could use to collate and manipulate the financial data. (1)

8.9 Jane and Mohammad are appointed the IT technicians and trouble shooters for the tournament. They will have to deal with any technical problems and solve them during the course of the evening.

    8.9.1 One of the learners brings an old projector with only a VGA input and wants you to enable him to project his game playing on the wall-mounted screen.

    8.9.2 None of the learners' consoles can connect to the school's WiFi Internet.

    8.9.3 The image for a learner using the school terminals is displaying incorrectly.

    8.9.4 During the tournament, the school building is struck by lightning and although the UPS kicks in, one learner's console will not switch back on.

    8.9.5 An American exchange learner brings her Nintendo Wii, which she purchased in the United States, to play in the tournament, but it will not switch on.

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

Question number	Possible problem	Possible solution
8.9.1		
8.9.2		
8.9.3		
8.9.4		
8.9.5		

(10)

8.10 A parent has expressed concern that by allowing the learners to connect to the Internet, they will be free to "surf" the web and could be cyberstalked or access unsuitable web pages.

    8.10.1 Name **ONE** hardware method the school can use to restrict the learners' Internet access. (1)

    8.10.2 Name **TWO** software methods the school can use to restrict the leaners' Internet access. (2)

50 marks

Total: 150 marks