ZIMSEC

For Performance Measurement

ZIMBABWE SCHOOL EXAMINATION COUNCIL

GENERAL CERTIFICATE OF EDUCATION
ORDINARY LEVEL

QUESTION AND ANSWER BOOKLET FOR

COMPUTER SCIENCE – 4021

NOV 2014 – NOV 2020

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COMPUTER SCIENCE – 4021

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ZIMBABWE SCHOOL EXAMINATIONS **COUNCIL**

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/1

PAPER 1 Multiple Choice

NOVEMBER 2014 SESSION 1 hour

Additional materials:
Multiple choice answer sheet
Soft clean eraser
\Soft pencil (type B or HB is recommended))

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question there are four possible answers, **A, B, C** and **D.** Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet provided.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES
Each correct answer will score one mark. A mark will **not** be deducted for **a** wrong answer.
Any rough working should be done in this booklet.

This question paper consists of 9 printed pages and 3 blank pages.

[Turn over

1 A scanner can be described as

A an output device only.
B an input device only.
C an input and output device.
D storage device.

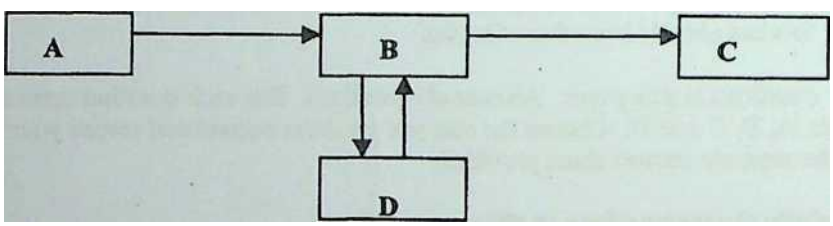
2 Microsoft Windows is an example of

A an operating system.
B a database program.
C a word processing program.
D a graphics program.

3 The best input device suitable for a visual impaired person is a

A standard keyboard.
B touch screen.
C microphone.
D mouse.

4 The diagram represent components of a computer system.



In which component would a printer be found?

5 77 converted to binary is

A 1011001
B 1001101
C 1100111
D 1001001

6 The data stored on a CD-ROM is

A volatile and read only data.
B non-volatile and read only data.
C non-volatile and read/write data.
D volatile and read/write data.

7 The speed of a computer CPU can be measured in

A gigabytes.
B gigawatts.
C gigahertz.
D gigacycles.

8 Which of the following has the fastest access to data?

A DVD drive
B floppy disk
C zip disk
D hard disk

9 Which of these methods of data input is commonly used to read account numbers on cheques?

A MICR
B OCR bar codes OMR
C
D **10** The device that links computers to telephone networks by converting digital and analogue signals is called a

A transcoder.
B modem.
C digitiser.
D translator unit.

11 Which one is **not** a programming language?

A COBOL
B LINUX
C ORACLE
D Visual Basic

12 A program compares two numbers to find which is greater. The action is carried out in

A arithmetic and logic unit
B random access memory.
C read only memory.
D the control unit.

13 A number has to be entered into a database; It is first checked by the database software to make sure that it is really a number and not a letter. This is an example of

A verification.
B parity checking.
C formal checking.
D validation.

14 The world wide web is the name that is given to

A all the linked documents that are held on a global network of computer system.
B the world wide e-mail system.
C the cables and communication satellites that connect computer systems all over the world.
D the organisation that regulates the internet.

15 What are scroll bars used for?

A To close a window.
B To open a window.
C To see parts of the window which are hidden.
D To resize a window.

16 A URL is

A a Universal Relocator.
B a Uniform Resource Locator.
C a Universal Resource Locator.
D a Uniform Result Locator.

17 Disinfecting a file means

A cleaning the computer.
B removing a virus from an infected file.
C spreading a virus to another computer.
D downloading a file containing a virus.

18 Which of the following is **not** a good security practice?

A Telling other people your password.
B Changing your password regularly.
C Not using an obvious word or name.
D Committing your password to memory instead of writing it down.

19 A local council wants to design and build a new bridge. Which one is the most appropriate

software to use in the design?

A CAD application
B CAM application
C DTP application
D Drawing application

20 Which one of these is the type of a network that links computers in different cities or countries?

A LAN
B MAN
C PSTN
D WAN

21 Using My Computer, which of these criteria **cannot** be used to search for a particular document?

A who has ever opened the document
B Type of document (e.g. word, excel, etc)
C when the document was last modified.
D Size of the document.

22 An intranet is best defined as

A a network which can only be accessed using an ISP.
B a world-wide collection of computer files connected by links.
C a network, using e-mail and web within a single organisation.
D a network that is shared by more than one organisation.

23 Which role in the IT department best suits a secretary?

A Database administration
B Data capture clerk
C Network administrator
D Systems analyst

24 One method of validating a number such as a barcode is to perform a calculation to produce an extra character. The characters appear at the end of the original number. This method of validation involves

A a parity check.
B a hash total.
C a check sum.
D a check digit

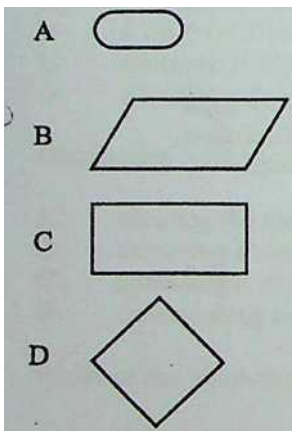
25 The NAND is a combination of the

A two AND gates.
B Not and OR.
C Not and AND
D exclusive AND.

26 Which is the best suitable method of data collection, when you need immediate response?

A questionnaires
B interviews
C observations
D record inspection

27 Which of the following symbols represents a process?



28 The process of moving from an old system to a new system is called

A implementation
B system design
C system testing
D analysis

29 The most efficient way to send a letter to all employees on the database would be to use

A normal data entry.
B cut and paste.
C mail merge.
D text entry.

30 Choose the most suitable package to provide a catalogue containing graphics.

A Desktop Publishing
B Spreadsheet application
C Word processing application
D Multimedia application

31 Which one of the following best describes the GUI?

A A graphics package for technical illustration.
B Typing in commands to operate a computer.
. C Providing graphical online help to assist the computer user.
' D A system using windows, pointers and icons to operate a computer.

32 Choose the most appropriate application to store student's information.

A Data logging application
B CAD application
C Word processor application
D Database application

33 Identify an error which is generated during execution of a program.

A Logic error
B Rimtime error
C Syntax error
D transposition error

34 Which one of these stages of software development is the last stage to be completed?

A Analysis
B Design
C Testing
D Program

35

/ \ No
.condition)

Yes
(end)

The programming construct above is a

A selection
B repetition
C sequence
D fixed

36 Which one of the following is not a method of finding out about existing systems.

A asking questions
B 'getting people to fill questionnaires
C getting the raw data into form that can be processed by the computer
D inspecting any bits of paper and files

37 E-commerce is

A requesting information from companies selling electronic equipment.
B advertising electronic goods on the internet.
C buying of goods and services and paying for them on-line.
D buying of electronics equipment from high street shops.

38 Which of these options cannot be changed in the print dialogue box?

A How many copies are to be printed.
B Which pages are to be printed.
C Which printer to use.
D The font size the document should be printed.

39 The software used to allow a computer to communicate with a peripheral such as a printer is called

A a driver.
B an application.
C a utility.
D a protocol.

40 The best way to reduce the risk of Repetitive Strain Injury (RSI) is by performing one of the following actions.

A Using an adjustable chair.
B Sitting with your feet firmly on the ground.
C Using an anti-glare screen. «•
D Taking frequent breaks from your work.

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ZIMBABWE SCHOOL EXAMINATION COUNCIL

GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE

NOV 2014 **4021/1**

1	C
2	A
3	C
4	C
5	B
6	B
7	C
8	D
9	A
10	B
11	B
12	A
13	D
14	A
15	C
16	B
17	B
18	A
19	A
20	D

21	A
22	C
23	B
24	D
25	C
26	C
27	C
28	A
29	C
30	A
31	D
32	D
33	B
34	C
35	B
36	C
37	C
38	D
39	A
40	D

Surname
Forename(s)

Centre Number

Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/2

PAPER 2 Structured

NOVEMBER 2014 SESSION 2 hours 30 minutes

Candidates answer on this question paper
No additional material is required

TIME: 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your Name, Centre number and Candidate number in the spaces at the top of this page and your Centre number and Candidate number on the top right corner of every page of this paper.

Answer **all** questions

INFORMATION FOR CANDIDATES
The number of marks is given in brackets [ ] at the end of each question or part question.

This question paper consists of 13 printed pages and 2 blank pages.

1 (a) Explain with the aid of an example, the term *hardware.* **for**

Uic

_____

_____

_____ [2]

(b) Explain what is meant by the term *software.*

_____

_____

_____

_____ [2]

(c) Give three differences between Read Only Memory (ROM) and Random Access Memory (RAM) _____

_____

_____

_____ [3]

2 State the input devices used on the Point of Sale terminal (POS) and for each input device identified explain the purpose.

Device 1[1]_____

Purpose_____

_____ [1]

Device 2: [1]_____

Purpose_____

_____ [1]

3 **(a)** Identify **four** internal components of a computer system. **Fra Essnffiet ****

(b) Explain the function of each component named in (a) above.

1 _____ ____

_____ ____

4 Describe **one** role for each of the following IT personnel:

(a) Data capturing clerk:

_____

_____ [1]

(b) Hardware technician:

_____

_____ [1]

(c) Systems analyst:

[1]

(d) Programmer:

[1]

Phishing and spam are some of the threats affecting internet users. Explain the terms phishing and spam.

Phishing-.

[1]

Spam\

[1]

In a hospital a computer is used to monitor a patient's condition.

(a) What is the input for the syst> ..i?

[1]

(b) Describe the processing done by the computer.

[3]

(c) State **one** output from the system.

[1]

7 An expert system is designed for mineral prospecting.

(a) Define an *expert system.*

[1]

(b) Describe the steps taken to create and test expert systems.

[4]

8- In systems analysis and design, fact finding involves collecting data.

(a) List **four** methods of data collection.

1_____

2 _____

3 _____

4 _____[4]

(b) Describe any **two** activities carried out at each of the stages of systems development life cycle.

(i) Analysis:_____

_____

_____ [2]

(ii) Design:_____

_____

_____ [2]

(iii) Implementation:_____

_____

_____1
[2]

(iv) Maintenance: _____

_____

_____ **[2]**

(c) Outline the importance of user and technical documentation in systems analysis and design.

Far ExBEtmeri

(i) User-documentation:

_____

_____

_____[1]

(ii) Technical documentation:

_____

_____

_____ [1]

(d) Explain the purpose of a feasibility study. _____ _ _____

[1]

9 **(a)** Illustrate using a diagram, the following programming constructs:

(i) repetition/loop construct

[3]

(ii) selection construct

rar
Esamiaa's
UK

[3]

(b) Using a pseudocode or otherwise write an algorithm that will add
5 numbers and output the avt 'ge.

[5]

(c) **(i)** Give **two** differences between a compiler and an interpreter.

[2]

(ii) Give **two** advantages' f a high level language.

[2]

10 A funeral service company is considering installing a network. One of the options they consider is a peer-to-peer network.

Far

U88

(i) Explain what a peer-to-j >r network is.

[2]

(ii) Explain why a peer-to-peer network may be suitable in this situation.

(iii) Identify **three** benefits for your school of having a website.

[3]

[3]

(iv) Explain why video conferencing is best achieved with a broadband connection.

For Exainins's Use

(b) Give two advantages of a word-processor over a typewriter.

[3]

11 **(a)** Explain what is meant by *mail-merge.*

[2]

[2]

(c) Explain why someone may set up a query when using a database

Far Examiner *®

_____

_____

_____ [2]

(d) In a spreadsheet cell Al contains the value 5, A2 contains the value 7 and A3 contains 10. Write a formula to add the three numbers and divide the total by 3.

_____

_____

_____

_____ 7 _____ [2]

(e) Identify a structure that holds data in a database. _____

---------- :—-_____ _____ [i]

12 Employees in a social office use computers for long periods of time.

State **two** health problems which can be caused by such use and give a solution to each of the problems.

Problem 1:_____ _____ _____

_____

Solution: __ _____

_____ [2]

Problem 2:_ _____

_____

Solution:_____

_____ [2]

13 (a) Sunrise High School has decided to buy a microcomputer. A consultant has suggested that they install a Local Area Network (LAN).

(i) What is a LAN?

[1]

(ii) Draw a diagram to illustrate a star topology.

[5]

(b) One communication service that can be provided on a network is e-mail facility.

State **two** advantages of Electronic Mail (e-mail)

1 _____

[2]

(c) Give any **three** advantages of mobile phones. Ura

1 _____

.[3]

ZIMBABWE SCHOOL EXAMINATION COUNCIL

General Certificate of Education Ordinary Level

EXPECTED ANSWERS

NOVEMBER 2014

COMPUTER SCIENCE **7014/2**

1 **(a)**

Hardware refers to the physical components of a computer system Examples: mouse, keyboard, printer, scanner

(b)

Software - is the set of programs that controls computer hardware
Examples : word processor, spreadsheet, presentation and operating system

(c)

ROM	**RAM**
Is non-volatile	Is volatile
Data is there even if power is off	Data is lost when power is off
Contains boot-up files	Stores user's programs and data when in use
Does not need a top up	Needs a top up
Data is permanent	Data is temporary
Is read only	Is read and write

2 **(a)**

Scanncr/barcode readcr/wand
Keyboard
Mouse
Touchpad
Touch sensitive screen
Magnetic strip reader
Chip and pin reader

NB: learners should explain each input in relation to the point of sale.

3 **(a)**

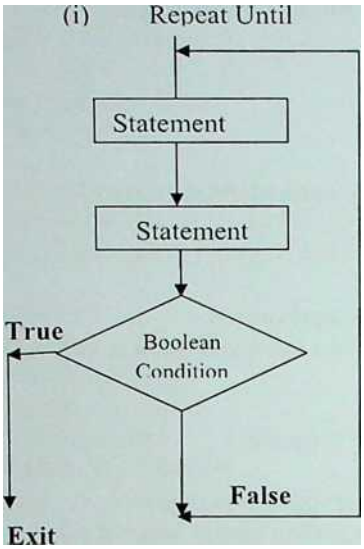
1. Arithmetic Logic Unit (ALU) - carrying out calculations and logical operations
2. Control unit - executing program instructions
3. Bus - transfer of data between components in a computer
4. Memory/registers -used for temporary storage of data awaiting processing
5. Fans - cools the computer system to avoid overheating
6. System clock - a timer that helps the computer clock to keep correct time
7. CPU - performs data processing/stores data and instructions/controls operations of the computer
8. RAM - temporary storage of data and instructions processed or awaiting processing
9. Hard disk- storage of files and data
10. ROM - permanent storage of data such as boot files, firmware etc

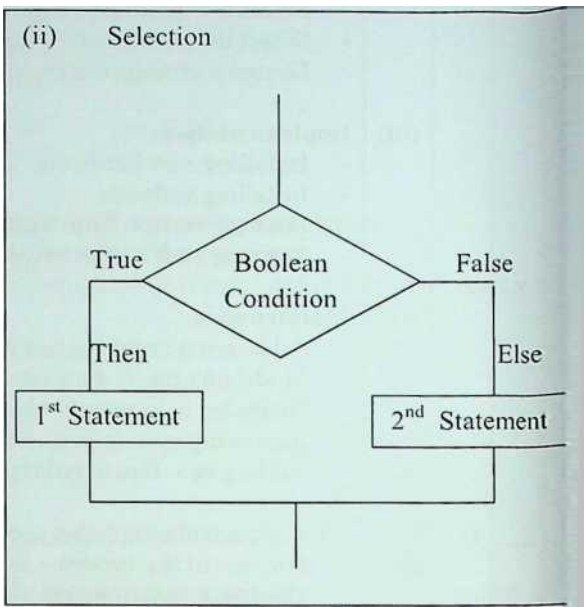
4	**(a)**		**Data capturing clerk** Entering data into a computer system Verification of data Collection of data Data preparation
	(b)		**Hardware Technician** Identifying hardware problems Troubleshooting Connecting hardware components Testing of hardware components Hardware maintenance Repair of hardware Hardware resource outsourcing
	(c)		**System Analyst** identify computer system problems designs/recommend solutions to problems plans the development of the system system implementer carries out cost benefit analysis comparing current and proposed systems carries out requirements analysis training of users
	(d)		**Programmer** designs computer programs inns computer programs debugging of programs program testing coding writing of algorithms produces technical documentation
5	**(a)**		Phishing is a scam where thieves attempt to steal personal or financial account information by sending deceptive electronic messages that trick unsuspecting consumers into disclosing personal information such as ID numbers, credit card numbers, PINs and passwords Spam - unsolicited messages such as e-mails sent to a large number of people for the purpose of advertising, phishing or spreading malware.

6	**(a)**		Blood pressure Pulse rate/heart rate Temperature Blood sugar level Breathing rate
	(b)		Analogue input signal is converted to digital for processing by computer Input data is compared with preset values stored in the computer - Siren/alarm raised to attract attention of nurse/doctor if input not in range of preset vali
	(c)		Graphs Siren Alarm/buzzer Colour indicators Flashing lights Values/digits/figures
7	**(a)**		A computer program that mimic/simulatc knowledge and experience of a human expert
	(b)		Acquire information from experts Input data into knowledge base Populate rule base Create an inference engine Create human-machine interface Test system with known problems and solutions Create output screen Create/design validation routines
8	**(a)**		1. Questionnaire 2. Observation 3. Record inspection 4. Interviews
	(b)	**(i)**	**Analysis** Interviewing workers and management Requirements analysis (hardware, software and user requirements) Studying current system inputs and outputs Coming up with data flow diagrams
		(ii)	**Design** Designs the user interface (input forms). Designs the screen layouts. - Designs output forms and reports layouts. - Produce flowcharts and/or pseudo code (algorithms). Select/design any validation rules that need to be used. Select the most appropriate data verification methods. Design file structurcs/tables for the storage and organisation of the data. _____

			Select the hardware requirements for the new system. Select the software requirements for the new system. Design a testing strategy/plan.
		(iii)	**Implementation** Installing new hardware Installing software Data conversion from manual into computerised system Training staff on the new system
		(iv)	**Maintenance** Addressing problems not identified previously Modifying the system when circumstances change, e.g. volume of data increases Upgrades in computer hardware Improving system performance Adding new functionalities to the software
	(C)	(i)	User documentation helps users on the following aspects Purpose of the system - what the system can do and can't do. Hardware requirements - list of the hardware the user needs to run the system. Software requirements - which software can be used to run the system (windows, mac OS etc.) How to start/shut down the system. How to log in and log out of the system. How to search for system data. How to input new data. How to amend, sort, save data. How to produce printouts. How to handle system errors. FAQs - known problems or questions that users may have. Troubleshooting guide - these tell the user how to identify what has gone wrong with the system and what can be done about it. Glossary of technical terms. How to install the system. Screenshots showing the system in typical use. Sample inputs and outputs.
		(ii)	Explains a system to a specialist e.g. a programmer or a system analyst It assists programmers make amendments/modifications to the system
	(d)		- It helps management to decide whether to go ahead with the problem or not Helps management to decide if system will be economically feasible Check if system can be completed in time Check if system is legally acceptable Check if system will be accepted and be supported by users of the system

(a)





(b)

Set total to zero Set count to one
Repeat
Input Number
Add Number to total
Add one to count
Until count = 5 *Average — total / count Output Average*
Set total to zero

OR

Set count to one
While count <> 5 *Do*
Input Number
Add Number to total
Add one to count
Endwhile
Divide Total by count Output Average

(c) **(>)**

Compiler	**Interpreter**
Translates whole program at once	Translates program statement by statement
Translates before execution	Translate during execution
Produces object code	No object code produced
List error after translation	Indicate errors during translation
Difficult to debug	Easy to debug
Object code used without the source code and is portable	Needs source code to be executed
Requires more memory	Requires less memory

		(ii)	Some of the advantages of High Level Languages are: They are easier to learn and understand, since they resemble human language. They require less time to write. They are portable i.e. a program developed in high level language can be run on any computer. They are problem oriented rather than 'machine' based. They arc easier to maintain. They are easier to debug. Debugging is the process of removing errors (bugs) in a program. They are less error prone due to less rigid syntax rules. They are user friendly (closer to human language). Programmers do not have to learn a new language for each computer they program
10	**(a)**	**(i)**	A peer to peer network is a network created when two or more PCs arc connected and share resources without going through a separate server computer. Each workstation can use resources from any other workstation and communicate directly with every other workstation on the network without going through the server. Is normally implemented when security issues arc not much of a concern. Storage facilities are distributed throughout the network
		(ii)	No need for a network operating system No need for an expensive server No need for specialist network experts Much easier to set up If one computer fails, it will not disrupt other computers Less people accommodated, hence no traffic problems
		(iii)	Advertising the school Collecting orders Provide information and announcements to learners and parents The website can be used to provide e-learning facilities Electronic registration of students
		(iv)	Large amounts of data transmitted because there are many pictures and videos involved. Many frames per second can be obtained to produce smooth movement Broadband can send lots of data per second/faster transmission
11	**(a)**		This is a technique for creating many letters or documents based on a template and a database of names and addresses. Most word processors have a mail-merge facility. You create the basic template and within that you put 'placeholders' for names and addresses. The mail-merge then looks to a database (or spreadsheet) you have set up and it will then take each name and address and produce a custom document.

(b)

The main advantage of word processing packages over type-written documents is that the Large documents can be backed up for easy retrieval in case of loss through natural disasters.
Documents can be easily searched for quickly.
Graphics such as pictures can also be incorporated into a word processor.
Mistakes can be easily corrected without spoiling the appearance of a document throng crossings-out.
The document can be viewed before printing.
A user can insert or delete words, sentences or paragraphs.
The document can be printed more than once.
Sections of text can be moved to another part of a document.
You can make use of the tools e.g. spell checker, grammar checker to improve the accuracy of your document
You can make use of the large number of templates available or you could create your own template and house style
You can import data from a database or spreadsheet and use it to create a mail merge

(c)

To extract (filter/search) a subset of the data
To find particular items of the data
To link tables together
To delete certain records
To update certain records

(d)

= su?n(Al: A3)/3
= (Al *+A2 + A3)/3*
= *Average(Al:* A3)

(e)

Table/file

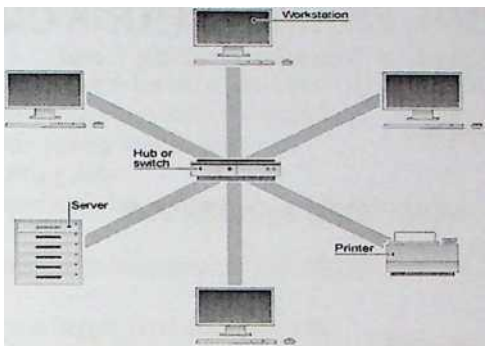
12 (a)

Problem	**Solution**
Repetitive strain injury	Good keyboard design/ergonomic keyboard Frequent breaks
eyestrain	Anti glare screen Frequent breaks Regular eye checks Suitable lighting Monitor should not face direction of light Adjust screen brightness Correct angle of screen
Back ache	Use of adjustable chair Foot rest Regular breaks

---

13 (a) (i) Local Area Network - interconnection of computers and peripheral devices that cover a small geographical area

(>') Star Topology



(b) It is cheaper, eliminates long distance costs through telephone or sending mail by post.
It is a faster way of communication compared to the traditional post.
It allows multiple addressing - the same e-mail can be sent to several different people at the same time.
The recipient docs not have to be present to receive mails. Messages are stored at the Internet Service Provider and can be retrieved at any time.
You can access your mails from wherever there is internet access.
Messages can be kept in your mail box for years and years.
You can attach text documents and multimedia files through email.
You can forward messages you would have received to many other people.

They are cheap
They can be connected to the internet
You can play music
You can play games
They can be used as a learning tool
People socially interact as they visit facebook
They are portable
You can download material e.g. e-books, video tutorials

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/1

PAPER 1 Multiple Choice

NOVEMBER 2615 SESSION 1 hour

Additional materials:
Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

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This question paper consists of 9 printed pages and 3 blank pages.

[Turn over

1 Which of the following is a type of system software?

A Database
B field
C DBMS
D file

2 Which of the following tasks is carried out by a microprocessor?
A removing virus from a computer
B performing calculations
C sorting data
D entering information into a computer

3 To increase the performance of a computer, one has to

A use a bigger read only memory.
B use a bigger random access memory.
C use two operating systems.
D use the latest operating system.

4 A Graphical User Interface (GUI) represents a program with a picture. This picture is called

A a menu.
B a control
C a button.
D an icon.

5 Which of the following tasks is not carried by an operating system?

A transferring data to a printer
B allocating storage space on a disk
C accepting keyboard input
D adding colour to a drawing on screen

6 Which of the following arrangement of units of computer memory is a correct sequence?

A bit, byte, kilobyte, gigabyte, megabyte. B bit, megabyte, kilobyte, gigabyte, byte. C gigabyte, megabyte, kilobyte, byte, bit. D gigabyte, megabyte, kilobyte, bit, byte.

7 A virus scan should be done regularly on a computer to

A create new files and folders which are free from virus.
B detect virus and remove it from the computer.
C create write protected files which cannot be infected by virus D make virus weak and less harmful.

§ Personal data refers to

A data stored on one's personal computer. 3 '
B data purchased by a person.
C data about people which they may not want others to know.
D data held by someone for personal use only.

9 E.F.T stands for

A Extended funds Transfer.
B Electronic funds Transfer.
C Electronic Full Transfer.
D Electronic Final Transfer.

10 Which **one** is **not** a disadvantage of e-commerce?

A possible credit card fraud.
B customers may have problems with returning faulty goods.
C large stock range available.
D seller and buyer have no physical contact.

11 **A** good way to avoid back problems when using a computer is to

A take regular breaks.
B use an ergonomically designedkeyboard.
C use wrist-rest.
D use a suitably sized monitor.

12 People can only complain about the inaccuracy of data if

A they have "suffered damage" from it.
B it is held for "national security" purposes.
C they can find out who is storing data about them.
D it is on paper files.

Which expert system feature is not in use during consultation by a client?

—13 C inference engine

knowledge base knowledge acquisition engine

D rule base

14 A systems programmer is someone who

A assess system software.
B codes system software.
C takes a system through the stages of system life cycle.
D arranges programs systematically.

15 A biologist uses a computer to simulate or model the growth of an insect population. The main advantage of using computer modelling in this case is

A the results are likely to be very accurate.
B there are very few variables to take into account..
C more generations can be tested in a limited time.
D results will always be the same.

16 Which of the following would be recommended to prevent unauthorised access to data on a computer?

A creating back up files
B switching off the computer after use
C make use of an up to date antivirus program
D creating username and password

17 Choose the best reason why introducing a word processor in a school may worry some of the office staff.

A fear of coping with the new equipment
B fear of spending a lot of money on the new equipment
C fear of employing more people to do the work
D fears of overhead costs

Question 18,19 and **20** refer to the following passage.

An experiment is set up to investigate the rate at which boiling water cools in a science laboratory. The laboratory technicians decided to use data logging equipment connected to a microcomputer to collect this data.

18 Wliat type of sensor would be used to collect the data?

A temperature
B sound
C pressure
D light

19 What would be the most suitable time period for logging?

A 30 seconds
B 30 minutes
C 3 minutes
D 3 hours

20 From the list below, choose the most suitable time interval for sensing.

A 30 seconds
B 130 seconds
C 180 seconds
D 240 seconds

21 When planning a project, staffing issue will be principally addressed in the

A design
B analysis
C maintenance phase
D feasibility study

22 Choose the circumstance which is likely to require program maintenance.

A the organisation changes to a new operating system.
B the program is being abandoned
C a new system is introduced
D new users are appointed

23 Which of the following shows the stages of problem solving in their correct order?

A design, analysis, problem definition, feasibility study
B problem definition, feasibility study, design, analysis
C problem definition, feasibility study, analysis, design
D design,feasibility study, analysis, problem definition

?*A* Which of the following items constitute the design stage?

A designing a set of test data
IB training staff
C designing validation methods
D studying the existing system

25 Why is it a good idea to build programmes from small modules?

A the finished program is smaller,
B the finished program runs faster.
C maintenance is easier.
D there is less testing to do.

26 Your school administration is considering using a computer system to handle stock records and loan of books in the school library. Which of the following would **not** be necessary in finding out about the existing system?

A interviewing users of the system.
B providing systems flowcharts and or pseudocodes.
C design reading manuals or instructions which are in use.
D observing the current system in operation.

27 A language which is close to machine code is

A low-level language.
B high-level language.
C declarative language.
D imperative language.

28 A diagram that represents an algorithm is

A a program flowchart
B a systems flowchart
C a data flow diagram
IQ) an entity relation diagram

29 A decision box in a program flowchart has

A one input and one output.
B one input and two outputs.
C two inputs and one output.
D two inputs and two outputs.

30 The following are advantages of high-level language except

A simple instructions similar to English which are easier to understand.
B easy to correct errors.
C one to many relationship with machine language
D one to one relationship with machine language

31 An algorithm written using English like statements is called

A high level code.
B object code.
C pseudo code.
D two level code.

32 Which type of data is used to test a program for values within a given range?

A abnormal data
B standard data
C extreme data
D live data

Question 33 and 34 refer to the following algorithm.

```
Count = 1
Total = 0
While Count < = 5
Do
Input number
Total = Total + number
Count = Count + 1
Endwhile
Output Total
Output Count
```

33 Dry run the algorithm using 23,5,4, - 1.

The total is

A 13
B 10
C 9
D 11

34 The count is

A 10
B 6
C 11
D 9

35 A computer network that is confined to a site is called a

A MAN
JB LAN
C WAN
D PAN

36 A device which allows a computer on a terminal to use a telephone line in communication is called a

A fax machine.
® modem.
C print server.
D digitizer.

37 Which of the following is a closed version of the internet, which can only be accessed by authorised members of an organisation?

A Extranet
B Local Area Network
C Wide Area Network
D Intranet

38 A person often wants to down load music from the internet but finds it too slow. The best way to reduce download time would be to

A change to a different ISP
B Install more RAM
C install a broadband connection
D increase hard disk space

39 A field type which is used to store data in a yes/no format is called

A a alphanumeric
B a numeric
C a text
D a boolean

40 The spreadsheet shown below is used to , z- . .
usea to calculate weekly food costs at an animal farm.

	A	B	C	D	E
1	**Animal Name**	**Number of animals**	Cost of Food for a meal	Cost of food for one anima!/ week	Total cost/ week
2	cattle	10	$2,50	$35,00	$350,00
3	goats	20	$1,00	$14,00	$280,00
4	sheep	**15**	$130	$21,00	$315,00

Which of the following statements is used to work out the values in the total cost per week column?

A cost of 1 meal x number of animals
B cost of animals x cost of food for one meal
C cost for 1 animal per week x cost of food for 1 meal
D cost of 1 animal for 1 week x number of animals

10
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ZIMBABWE SCHOOL EXAMINATION COUNCIL

GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE | NOV 2015 **4021/1**

1	C
2	B
3	B
4	D
5	D
6	C
7	B
8	C
9	B
10	C
11	A
12	A
13	B
14	B
15	C
16	D
17	A
18	A
19	D
20	A

21	D
22	A
23	C
24	C
25	C
26	C
27	A
28	A
29	B
30	C
31	C
32	B
33	A
34	B
35	B
36	B
37	D
38	C
39	D
40	D

Candidate Name Centre Number Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS **COUNCIL**

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/2

PAPER **2 Structured**

NOVEMBER 2015 SESSION 2 hours 30 minutes

Candidates answer on the question paper.
No additional materials are required.

TIME 2 hours 30 minutes

DESTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

This question paper consists of 12 printed pages.

1 Define the following computer terms, giving examples:

Fa

UK

(a) *Hardware*

_____

_____

_____ [2]

(b) *Software*

_____

___ _____ __ __ — _____ [2]

(c) *Input device*

_____

_____

_____ [2]

(d) *Byte*

_____

_____

_____ [21_____

(e) *Hard copy*

_____

_____

_____

_____.... [2]

_____

(f) *Batch processing*

[2]

A school with five hundred (500) students would like to buy a computer for entering , storing, retrieving and printing students' records. Recommend any two hardware and software components that would be required by the school.

(a) hardware

(i)

(ii) **[2]**

(b) software

(i)

(ii) **[2]**

Computer systems can be affected by malware.

(a) Define computer malware.

[1]

(b) Give any **three** examples of computer malware.

[3]

{Turn over

(c) Give any three effects of computer malware on computers.

Far aumrins Uss

[3]

(d) State any three methods of controlling computer malware.

[3]

4 An expert system may be written to diagnose diseases at a hospital.

(a) Briefly describe how such an expert system would be created.

[4]

(b) Give any **three** advantages of using an expert system to diagnose diseases.

[3]

(c) Give any three disadvantages of using an expert system. **Uw**

5 One of the stages of the systems development life cycle is feasibility study.

(a) Give any four activities that are involved in a feasibility study.

[3]

(b) Explain the purposes of the analysis stage.

[4]

[3]

(c) Name any two methods of implementing a new system and give one advantage of each.

(i) method 1 [1]

advantage

[11

(ii) method 2 [1]

advantage

[1]

(d) Before the system is implemented it needs to be fully tested. One of the tests will be to make sure that the company does not pay a worker less than a $1 or more than $ 800 per week. Using workers' pay give examples of:

(i) normal / standard test data [11

(ii) abnormal test data

[1]

(iii) extreme test data [1]

6 ***(a)*** Give any **four** advantages of using a high-level language for writing a program.

[4]

For Enanrinart Use

(b) Explain the purpose of the following program translators.

(i) compilers _____

_____

_____ **[2]**

(ii) interpreters _____

_____

_____ **[2]**

(iii) assemblers _____

_____

_____ **[2]**

(c) List three types of loop structures in programming.

(i) _____ **[1]**

(ii) _____ **[1]**

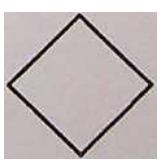
(iii) _____ **[1]**

(d) Name the following program flowchart symbols.

(i)

_____ **[1]**

(ii)



_____ **[1]**

7 Draw a flowchart for a program that accepts two numbers and displays the greater. (NB the numbers should not be equal). [5]

8 Explain the meaning of the following terms:

Far Runnlnci'i UM

(a) *intranet*

_____

_____

_____

_____ [1]

(b) *extranet*

_____

_____

_____ [1]

(c) Illustrate using diagrams the following network topologies.

(1) star

[2]

(ii) ring

[2]

[Turnover

(iii) bus

[2]

(b) The head of your school wants to implement a computer network which connects to the internet using the wireless system.

Justify the need for choosing the wireless system.

[2]

9 Panganai (Pvt) Ltd. Company purchased a set of ten computers for use in its Information Communication Technology (ICT) department.

(a) Name one job that can disappear by introducing computers.

[1]

(b) Give any **three** jobs that are created by introducing computers.

Job 1 [1]

Job 2 ---------- Hl

Job 3 — -- Hl

(C) Justify the need for introducing computers at Panganai (Pvt.) Ltd Company. **Use**

[2]

(<3) Explain any two changes in working procedures that can be credited by introducing computers at the company.

[2]

10 Student details at your school are stored in a database.

(a) Name three validation methods that can be done on data entered into the database.

(i) [1]

(ii) [1]

(iii) [1]

(b) Differentiate between data validation and verification.

[2]

11 **(a)** Explain why computers are widely used for process control in industries such as chemical industry.

[4]

(b) Explain why real time processing will be the most suitable method of processing in a chemical process control plant.

[2]

(c) Name any **one** sensor that can be used in a process control plant.

[1]

ZIMBABWE SCHOOL EXAMINATION COUNCIL

General Certificate of Education Ordinary Level

EXPECTED ANSWERS

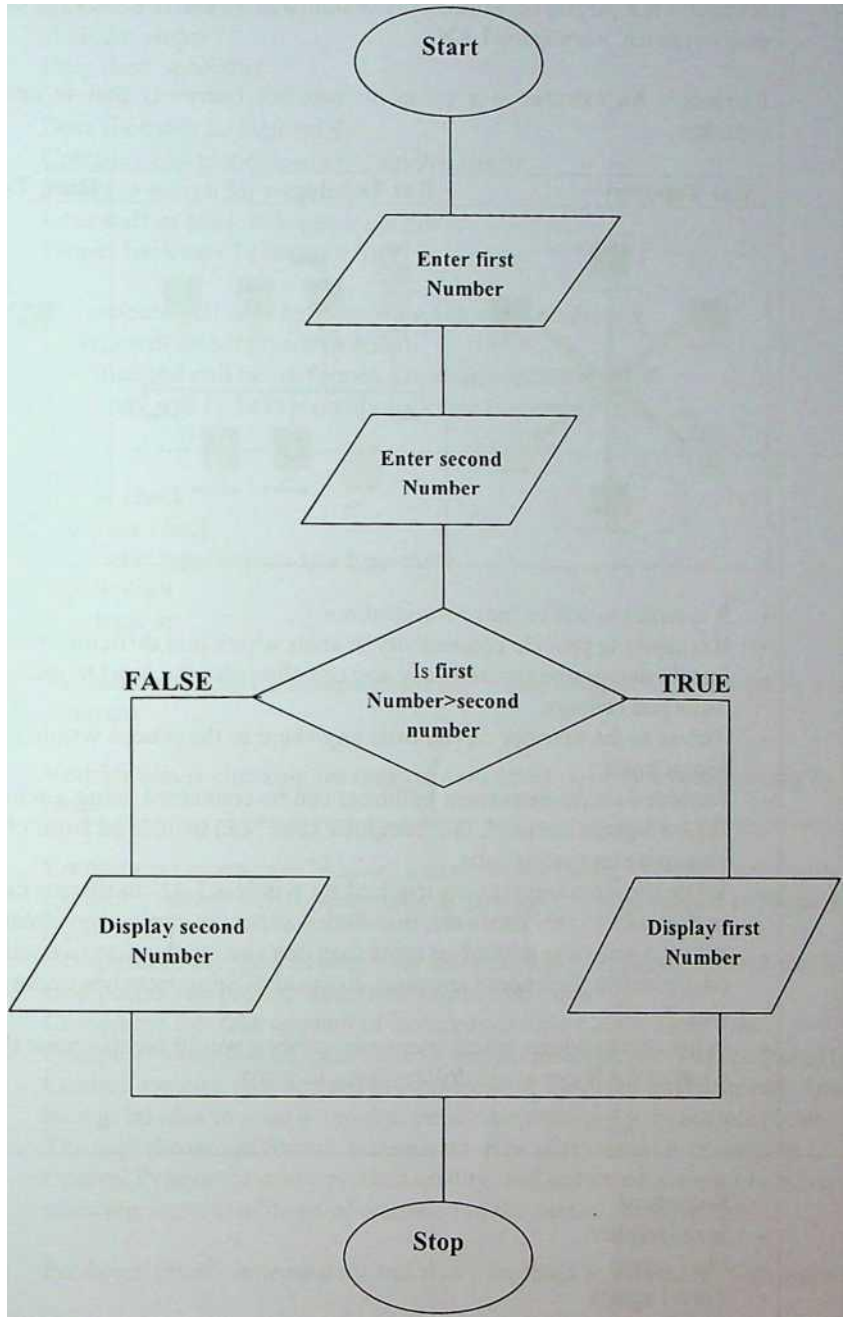
NOVEMBER 2015

COMPUTER SCIENCE **7014/2**

			-------- ---- ----- —---------- —
1	**(a)**		Hardware refers to the physical components of'a computer system Examples: mouse, keyboard, printer, scanner
	(b)		Software - is the set of programs that controls computer hardware Examples : word processor, spreadsheet, presentation and operating system
	(c)		Input device - is any hardware device used to enter/feed data into the computer system Examples: joystick , barcode reader, keyboard, mouse
	(d)		Byte - a group of 8 bits that represents a character Example-0101 0110, 1111 0000
	(e)		Hardcopy - computer output on paper/ printed document Example - newsletter from a printer, printed letter
	(0		Batch processing - Is when data is processed periodically in groups when fully input once processing begins, it proceeds to the end with little or no human interaction. Examples - water billing, payroll system
2	**(a)**		Hardware - mouse, keyboard, printer, monitor
	(b)		Software — word processor, presentation, database, spreadsheet, antivirus, operating systc
3	**(a)**		malware - programs which are written to harm or disturb computer oprations
	(b)		vims Trojan horse Worms Logic bombs Spyware adware
	(c)		The antivirus software indicates that malware is present. The computer runs very slow, not responding to commands executed by the usei times it takes a long time to start. The computer starts as expected sometimes, but at other times it stops responding bs the desktop icons and taskbar appears. The computer restarts itself frequently with no good reason. Applications on the computer do not work as they are supposed to. New programs also not install properly. An antivirus program is disabled for no reason and it cannot be opened. At time: antivirus cannot be installed on the computer.

	«i)		Strange dialogue boxes or message boxes appear on the screen. - New icons appear on the desktop that you did not place there. Strange sounds or music plays from the speakers unexpectedly. Out - of - memory error messages appear, even though your computer has plenty of RAM or hard disk space. Frequent lock-ups. freezing or crashing of the computer system. The virus may format your disk drive and even delete your computer files and programs Ways of preventing attack on computers by viruses Use of an up to date antivirus program Use of a firewall Isolation and Quarantining of infected machine from the network Scan email attachments Removable discs should be scanned Don't use pirated software Update the operating system regularly Regular backup Don't click links in websites that seem suspicious (if a site is offering prizes / free stuff/ etc. be suspicious!).
4	**(a)**		The process of building an expert system is called knowledge engineering and people who build expert systems are called knowledge engineers. To gather knowledge for the expert system, the knowledge engineers consult domain experts or other sources and this process is called knowledge acquisition. After acquiring knowledge from the human expert, the knowledge base is created. The rule (base) and the inference engine are created. The inference engine is the reasoning mechanism that manipulates the rules in the knowledge base to provide conclusions. The user interface is designed. The user interface is the means by which the user communicates with the expert system. The system is then tested using data with known outcomes to see if it functions correctly.
	(b)		Advantages of expert systems Permanence - expert systems do not die or forget but human beings may. Reproducibility - many copies of an expert system can be made, but training new human experts is time consuming and expensive. Consistency - with expert systems, similar transactions are handled in the same way. Humans are subject to making errors as they become tired. Breadth - an expert system combines the knowledge of many human experts, thus it has more breadth (knowledge) than what can be possessed by a single expert. Efficiency - expert systems increases the rate of doing work. With an expert system, information is sooner available for decision making. Reliability - if an expert system is fed with correct information, they are reliable.

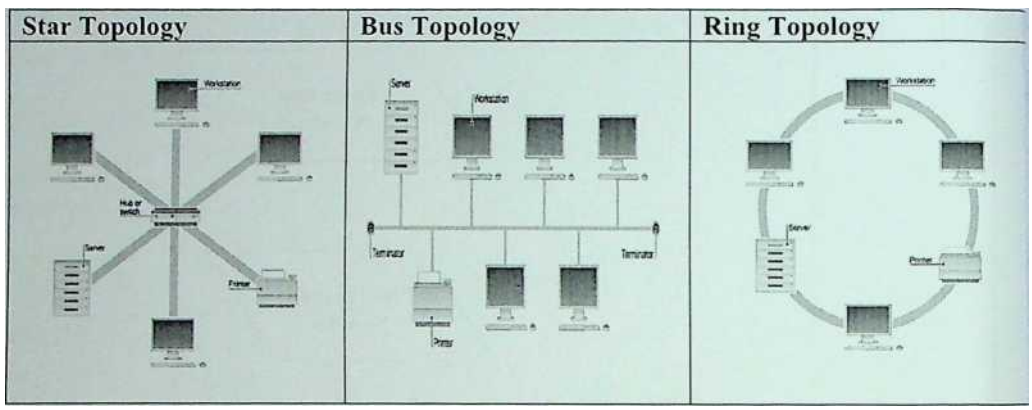
	(ii)	Interpreter - A translator program that converts a high level language source code/program t. object code line by line/statement by statement during execution of the program.
	(iii)	Assembler - A translator program that converts mnemonic code to machine code/language.
(C)	**(i)**	Repeat .....until
	(ii)	For.....next for
	(iii)	Do .... while ..... End While
(d)	**(i)**	Terminator Start/Stop
	(ii)	Decision Condition Branching


Start
Enter first Number
Enter second Number
Is first Number>second number
FALSE
TRUE
Display second Number
Display first Number
Stop

(a) Intranet - Is a private network that is designed to be used only by the organization's employees e.g. a company LAN

(b) Extranet - An extranet is a company network (intranet) that is accessible to authorize outsiders.

(c)



(d)

It is easier to add or move workstations.

It is easier to provide connectivity in areas where it is difficult to lay cable.

Installation can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

Access to the network can be from anywhere in the school within range of an access point.

- Portable or semi-permanent buildings can be connected using a wireless LAN. Where laptops are used, the 'computer suite' can be moved from classroom to classroom on mobile carts.

While the initial investment required for wireless LAN hardware can be similar to the cost of wired LAN hardware, installation expenses can be significantly lower.

Where a school is located on more than one site (such as on two sides of a road), it is possible with directional antennae, to avoid digging trenches under roads to connect the sites.

In historic buildings where traditional cabling would compromise the facade, a wireless LAN can avoid drilling holes in walls.

Secretarial Stenographer Mail carrier Travel agents Bank teller

Hardware technician Data capture clerk Network technician Programmer

(a)

(b)

			Systems analyst Database administrator Web developer Help desk specialist
	(c)		Data files will be kept safely Complex calculations will be handled easily Easier to search for records Less staff needed, reduced wage bill Proper back up of company files
	(d)		Documents will now be prepared using word processers Letters will be sent through email Calculations will be performed using spreadsheets Meetings will be held virtually by video conferencing
10	**(a)**		Range check Presence check Character type/format/data type check Check digit File look up
	(b)		Validation checks for completeness and reasonableness of data done by a computer program Verification is checking for transcription errors done by a human being by keying in data twice
11	**(a)**		Computers can operate 24 hours a day without taking a break, a holiday or sick days. Control systems reduce wage bills as less staff will be needed to monitor processes in the industry. Computers can repeat actions over and over and over again, humans can become tired. Computers can process data from sensors very quickly. Computers can take account of hundreds of inputs at the same time. Computer systems can make reliable and accurate decisions as compared to humans. Control systems can be used in dangerous or awkward environments where it wouldn't be a good idea to send humans to do the monitoring e.g. in nuclear plants. Through the use of control systems, wastage of resources is minimized. Control systems improve product quality, and ensure consistency in product quality by ensuring same conditions of operation in the manufacturing plant
	(b)		Produces results immediately and slows feedback to influence on an ongoing task
	(c)		Fleat sensor Moisture sensor Infra-red sensor Light sensor PH sensor Pressure sensors

Smoke sensor
Sound sensor
Tilt sensor
Touch sensors

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/1

PAPER 1 Multiple Choice

NOVEMBER 2016 SESSION 1 hour

Additional materials:
Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in **soft pencil** on the separate answer sheet provided.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will **not** be deducted for a wrong answer. Any rough working should be done in this booklet.

This question paper consists of 8 printed pages.

1 Which of the following devices is an output device?

A mouse
B joystick
C scanner
D motor

2 The speed of a processor can be measured in

A megabytes.
B gigabytes.
C gigahertz.
D kilobytes.

3 A car registration must now be in the format of letter; letter; number; number; letter; letter; letter.
To ensure that this arrangement is correct when data is entered into a database, which check would be used?

A a range check
B a check digit
C a picture check
D a presence check

4 37 converted to binary is

A 100101.
B 101100.
C 110100.
D 111000.

5 1 megabyte of memory contains

A 1024 bits.
B 1024 bytes.
C 1024 kilobytes.
D 1024 megabytes.

6 Modem computers are all based on digital technology. This means that data is

A handled by varying the electrical voltage.
B stored as a set of decimal numbers.
C handled as on/off electrical signals.
D always stored using ASCI 1 code.

7 The Data Protection Act forbids the passing of personal data

A to a third part under any circumstance.
B outside Zimbabwe.
C to the data subject.
D to a third part without the data subject's permission.

8 What device is used to enter data into a burglar alarm system?

A scanner
18 sensor
C light pen
D keyboard

9 Often, data is stored in a database in coded form. An advantage of this is that

A hackers will not be able to understand it..
B it is easier for the software to sort the data.
C it does not need validating.
D it takes less storage space.

10 A small computer is used in a car to show how far the driver can expect to go before needing to refuel. This type of computer system is

A process control.
B a simulation.
C embedded system.
D interactive.

11 Which of these is an example of computer control?

A weather forecasting economic modeling robotics data logging
B
C **12** A computer game allows the player to simulate driving cars around city streets.
D

Which of the following is an input into the system?

A the detection of a crash
B movement of a paddle on the console
C the car engine sound
D arrival at a cross-road

13 Computer simulations are sometimes used to predict the performance of a real-life situation, such as the crash behaviour of cars.

One reason for using computers in this way is

A computer generated results are likely to be more reliable.
B you can be sure that all relevant factors are taken into account.
C more variables can be investigated at the same time.
D much greater precision is possible.

14 Software that is used to help in the design of engineering components is called

A CAM.
B CAL.
C CAD.
D CAT.

15 A computer-controlled greenhouse is set to turn the heater on if it gets too cold and turn it off if it gets too hot.

A system like this where output affects the next input makes use of

A feedback.
B batch processing.
C multiprogramming.
D OMR.

16 The most reliable way of ensuring that data is not lost because of malicious activities is

A to install anti-virus software.
B to carry out regular backups.
C not to open emails.
D to install a firewall.

17 A computer virus

A always damages data.
B is likely to damage hardware.
C is designed to copy itself.
D only infects data files.

18 Hospitals use computer techniques to scan patients' bodies. This is called

A CAD.
B CAT.
C CAM.
D CAL.

19 Which item of information is NOT represented on barcodes found on supermarket products?

A Check digit
B Company code
C Product code
D Product price

20 Fact finding is done at which stage?

A Design
B Analysis
C Implementation
D Development

21 Deciding where the data will come from in a project is looked at during the

A design stage.
B implementation stage.
C analysis stage.
D problem identification stage.

22 When planning a project, staffing issues will be principally addressed in the

A design phase, analysis phase, maintenance phase, feasibility study phase.
B
C
D

23 When a new system is run side-by-side with the old system, this is called

A pilot running.
B all at once.
C module testing.
D parallel running.

24 Some computer-controlled systems have serious safety implications.

What is the best-way to guard against a system failure?

A Thorough alpha testing of the software
B Making sure that the hardware is up to date
C Having a back-up computer system
D Providing a human back-up system

25 An algorithm can be described by using a series of program-like statements but without writing the program. This is called

A high level code.

B low level code.
C object code.
D pseudocode.

26 Terminal symbol in a flow chart indicates

A end.
B processing.
C input and output.
D decision.

27 Structural programming is «•

A using classes.
B using structures in the program.
C dividing program into different program modules.
D coding program.

28 A decision box in a program flow chart has

A one input and one output.
B one input and two outputs.
C two inputs and one output.
D two inputs and two outputs.

29 **A** diagram that represents an algorithm is called

A a program flow chart.
B a systems flow chart.
C a data flow diagram.
D an entity relation diagram.

30 The steps necessary to solve a problem and used to design a computer program are called

A systems.
B algorithms.
C data flows.
D processes.

31 Which of the following is not a control structure?

A sequential.
B selection.
C repetative.
D algorithm.

32 Read the algorithm below

```
Input A, B
    If A> B then
       T = A
       A = B
    End if
    Output A, T
                End
```

Write down the output if the following two numbers are input: 41, 38

A 38,41
B 41,38
C 83, 14
D .14,83

33 An advantage of shopping over the internet is that

A there is a wide range of goods to choose from.
B the prices are always less.
C the suppliers are always reliable.
D sending money over the internet is secure

34 The reason why image files are often compressed on internet is

A the image quality is improved.
B they transmit faster.
C fewer pixels are used in the display.
D browsers can only display compressed images.

35 A system of web pages designed for use within one organisation is called

A internal mail.
B an intranet
C an extranet.
D an internet.

36 Some people are unhappy about using on-line banking. One reason is

A the bank is more likely to make mistakes.
B fear that their details may be accessible to others.
C the service could cost more.
D they will not be able to write cheques.

37 Which of the following is likely to take place in the design stage of systems development?

A testing the software
B filling in questionnaires
C determining tire contents of data tables
D parallel running

38 Which of the following is a job normally carried out by a systems analyst?

A producing a program specification
B writing the program code
C testing the program - .
D leading the programming project

39 In a spreadsheet, cell C12 contains the value 6, DI2 contains the value 12 and DI4, the value 10. Cell E16 contains the expression =C12*(D12 - D14).

What would be displayed in cell E16?

A -12
B 12
C 62
D **8**

40 **In** a spreadsheet, cell Al contains the value 4, A2 contains 5 and A3 contains 6. Cell A4 contains the expression = (Al + A2)* A3.

What would be displayed in cell A4?

A 34
B 1.5
C 24
D 54

ZIMBABWE SCHOOL EXAMINATION COUNCIL

GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE~T_NOV_2016_____402171

1	C
2	c
3	c
4	A
5	C
6	C
7	D
8	B
9	D
10	C
11	C
12	B
13	C
14	C
15	A
16	B
17	C
18	B
19	D
20	B

21	C
22	D
23	D
24	C
25	D
26	A
27	B
28	B
29	A
30	B
31	D
32	A
33	A
34	B
35	B
36	B
37	C
38	A
39	A
40	D

Candidate Name Centre Number Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/2

PAPER 2

NOVEMBER 2016 SESSION 2 hours 30 minutes

Candidates answer on the question paper.
No additional materials are required.

TIME 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

This question paper consists of IS printed pages and 1 blank page.

1 Explain using an example, the meaning of each of the following computer terms.

For Ezamina's Use

(a) deskilling

[2]

(b) interrupt

[2]

(c) virus

[2]

(d) data logging

[2]

(e) e-commerce

[2]

2 Data logging is used for monitoring the level of oxygen in a river.

For Exsmina' 5

(a) State any **one** item of hardware that is used as an input device to collect the oxygen data.

_____ [1]

(b) Explain any **two** processes that take place from the time the data logger is set up to collect readings of oxygen levels to when an analysis report on oxygen levels is produced.

process 1_____ __

_____ _____ [i]

process 2_____ __ _____

---------- ----- -_____ [1]

(c) Explain any **two** ways by which the oxygen data could be output for the user to understand.

1. _____ ____ ___

_____ _____ [1]

2. _____ ___

_____ _ - _____ [1]

(d) Explain what the computer would do if the amount of oxygen in the water is too high.

_____

_____

_____ [1]

For Eumino'n Use

(e) Give any **two** advantages of using data-logging for monitoring the oxygen levels in the river.

1

_____ [1]

2

_____ [1]

3 A mail order company is considering using a computer system for stock control and order processing.

(a) Give any **two** fact-finding methods that would be used.

Method 1_____

_____ [1]

Method 2_____ _

_____ [1]

(b) State any **two** activities that would be included in the feasibility report.

1 _____

_____ [1]

2 _____ ; _____

_____ [1]

(c) Identify any **three** tasks that would be done at the design stage.

1 _____

_____ [1]

2 _____

_____ [1]

3 _____

_____ [1J

(d) Describe **one** way in which the conversion from the old system to the new system could be done.

_____

_____

_____ [2]

(e) The new system was documented on-line. State any two advantages of on-line documentation over paper-based documentation.

1 _____

_____ [1]

2 _____

_____ [1]

(f) Use the listed system development stages to match the task given with the stage where it occurs: design, analysis, implementation, feasibility study.

TASK	STAGE
user training needs are decided	
systems flow charts are designed	
old data is converted to new system format	
program flowcharts are designed	

[4]

4 A school decides to allow internet access on all its networked computers.

For Examiner's

(a) State any two problems this could create and how the system could be protected against these problems.

Problem 1 _____

_____

Protection _____

_____ [2]

Problem 2 _____

_____

Protection _____

_____ [2]

(b) Student records are stored on a computer linked to the network to allow a teacher to access the information from anywhere on the school site.

State **two** precautions the school should consider to prevent unauthorized access to student records.

Precaution 1 _____

_____ [1]

Precaution 2 _____

_____ [1]

5 Video conferencing has increased in popularity over the last ten years.

(a) Describe any **one** type of software and any **one** type of hardware needed for video conferencing.

Software

[1]

Hardware

[1]

(b) Apart from video conferencing, state any **two** other forms of communication that exist which make use of computer networks.

1.

2- [2]

6 **A** large cinema uses a computer system to control the air conditioning system and also for the day to day business operations such as booking seats.

(a) Using the examples from the cinema application, explain any **two** differences between real time transaction processing and real-time process control.

Difference 1

[2]

Difference 2

[2]

(b) State any **three** tasks that are carried out by an operating system,

For Examiner

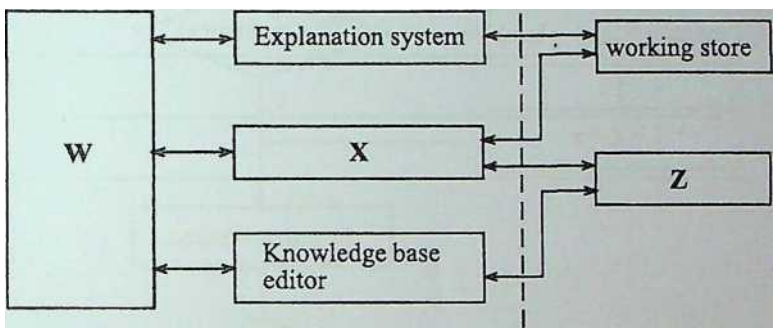
1. _____

_____ : _____ [i]

2, _____
[1]

3- _____ [1]

7 The following diagram shows a typical expert system.



_____

].----------Y ----------H

(a) Name the missing expert system features W, X, Y and Z using the following list of possible options:

Inference engine, expert system shell, knowledge base; user interface

W_____

X_____

Y_____

Z_____[4]

(b) Name **one** of the components that make up the knowledge base.

_____ [1]

(c) Give any **one** advantage and any **one** disadvantage of using expert systems.

Ter Exstnin s's

Advantage_____ __

_____ [1]

Disadvantage_____ _____

_____ [1]

(d) State any two examples of expert system applications.

1._____ ____

_____

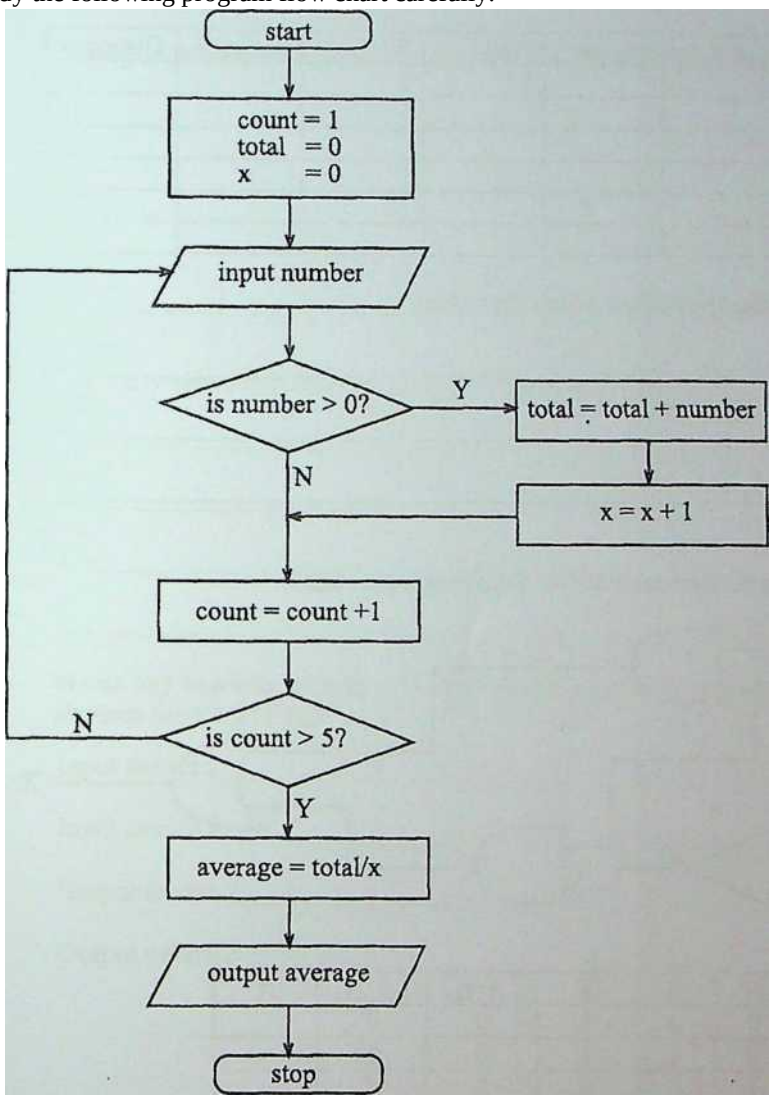
2. ____

_____ [2]

[Turn over

8 Study the following program flow chart carefully.

For Examiner 'll



(a) Complete the trace table for the following data set: 15,-2, 8, 0, 2

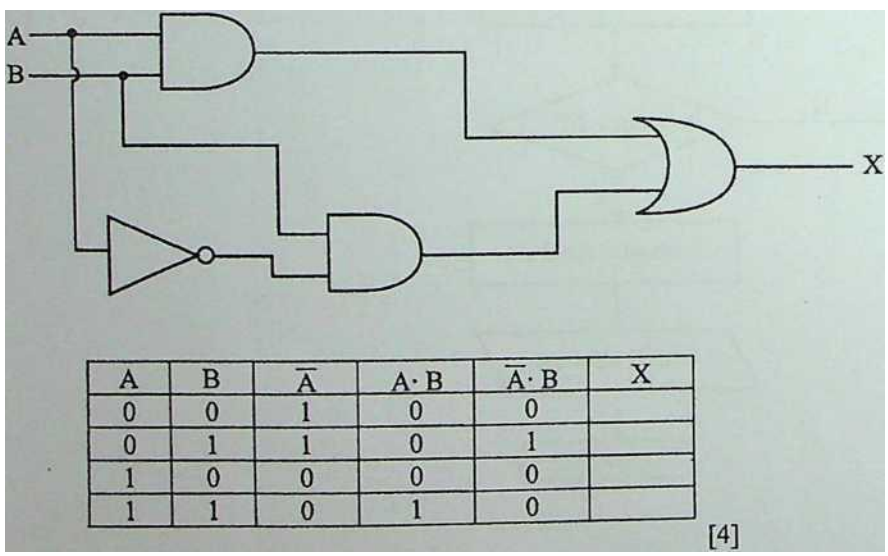
For Esaminer t

count	number	total	X	Average	Output
1		0	0		

(b) State the purpose of this flow chart.

[1]

9 Complete the truth table for the following logic circuit.



A	B	$\overline{A}$	A·B	$\overline{A}$·B	X
0	0	1	0	0	
0	1	1	0	1	
1	0	0	0	0	
1	1	0	1	0	

[4]

10 Computer Aided Design (CAD) has gained popularity in engineering and architectural design processes.

Examiner[1]!

(a) State any two reasons for the popularity of CAD in the design process.

1. _____

_____

2. _____

_____ [2]

(b) State any **two** disadvantages of CAD in the design process.

1. _____

_____

2. _____

_____ [2]

(c) Name any **two** specialist input devices and **two** specialist output devices used with CAD.

Input device 1_____

_____

Input device 2 [2]

Output device 1_____ _____

Output device 2[2]_____

11 Consider the following two pieces of program codes.

A	**B**
CLC	For loop = 1 to 4
LDX	Input number 1_3 number 2
Loop: LDA A, X	Sum = number 1 + number 2
ADC B, X	Print sum
STA C, X	Next for
INX	
CPX# 16	
BNE loop	

(a) Which of these codes A or B is written in a high level language?

_____ [1]

(b) Give any **two** benefits of writing a program code in a high level language.

_____

_____

2. _____

_____ [2]

(c) State any **two** benefits of writing a program code using a low level language.

_____

_____

(d) High level languages can be compiled or interpreted. State any **two** advantages of compiled programs over interpreted programs.

1. _____

_____

_____ _____

[2]

(e) State any two benefits of using modular programming to develop a program.

For Examiner 'G Use

1. _____

_____

2. _____

_____ [2]

(f) State any **two** differences between Repeat... Until and While ... Endwhile loop structures.

1. _____

_____ [2]

2._____ ____ _____

_____ [2]

(g) Describe any **two** different types of test data used to test a program when it is written.

1. _____

_____

2._____ _____

_____ [2]

12 A bank stores personal data about its customers on a computer file.

(a) State any **two** ways that the data protection laws safeguard personal data stored on the bank's computer system.

1. _____

2. _____

_____ [2]

(b) State any **three** items of personal data, in addition to the customer's account number, that the bank finds necessary to store.

1. _____

2. _____

3. _____

(c) State **one** reason why customer details need to be updated and describe the process that would be done by the computer system during the update process.

Reason _____

_____ [1]

Processes _____

_____

_____

_____ [2]

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General Certificate of Education Ordinary Level

EXPECTED ANSWERS

NOVEMBER 2016

COMPUTER SCIENCE **7014/2**

1	**(a)**		Deskilling is the loss of work related skills due to introduction of computer systems Example - office automation, robotics, process control systems
	(b)		Interrupt is a signal generated by a program/peripheral device to request for processor attention thereby causing a break in the execution of a current program Example - signal from a printer when out of paper or in case of a paper jam
	(c)		Virus - a program which self replicates and spread into other computers, corrupting files and damaging computer hardware. Example - file virus, boot sector virus, memory resident virus
	(d)		Data logging - is a process of automatically capturing data on physical quantities at set intervals using sensors and storing in memory remote from computers for later analysis. Example - collecting data in weather forecasting.
	(e)		E-commerce - is the buying and selling of products or services over electronic systems such as the internet Example - online shopping, EFT Point of sale
2	**(a)**		Oxygen sensor
	(b)		Measurement/recording of analogue oxygen level readings by oxygen sensor Conversion of measured readings to digital data by the ADC for storage Downloading collected data into the computer for analysis after data collection period
	(c)		Graphical displays/charts of oxygen levels Tabulated oxygen levels Printouts on maximum/minimum oxygen levels Pop up messages Sounds e.g. alarms, buzzers Colour indicators
	(d)		Pop up message displayed on monitor Red flashing light signal An alarm to signal that oxygen levels have exceeded the required levels
	(e)		Computers can operate 24 hours a day without taking a break, a holiday or sick days. Computers can reduce wage bills as less staff will be needed to monitor processes in the industry. Computers can repeat actions over and over and over again, humans can become tired. Computers can process data from sensors very quickly. Computers can take account of hundreds of inputs at the same time. Computer systems can make reliable and accurate decisions as compared to humans. Computer systems can be used in dangerous or awkward environments where it wouldn't be a good idea to send humans to do the monitoring e.g. in nuclear plants. Through the use of computer systems, wastage of resources is minimized. Computer systems improve product quality, and ensure consistency in product quality by ensuring same conditions of operation in the manufacturing plant.

3	**(a)**		Interviewing selected group of workers Use of questionnaires to collect data Sampling existing paper work/document inspection Observing the current system in operation Research from other organisations who have implemented similar system.
	(b)		Technical fcasilibility Economic Feasibility Legal and social feasibility Operational feasibility Schedule feasibility
	(c)		Designing data capture forms (input formats) - these are forms used for the input of data. Designing user interfaces (screen layouts) Designing output formats (reports) Designing file/database structures Designing data validation methods Designing data verification methods Designing system processes Selecting hardware requirements Selecting software requirements Selecting communication requirements Designing security requirements Designing test strategy/plan Designing flowcharts/pseudo codes (algorithms)
	(d)		- Parallel change over — it involves running the old and new system at the system for some time until new system proves to be efficient - Direct changeover - new system abruptly takes over from old system - Phascd/partial changeover-new system introduced in stages/phases c.g. department by department - Pilot changeover - one department runs new system for a trial period until system proves itself before being introduced to other areas.
	(e)		- Less storage space, no paper work Context sensitive help available Easier to update documentation No user manual reference Easy to find required topic Available anytime anywhere Data is secured through passwords

	(0		

TASK	STAGE
User training needs are decided	Feasibility study
System How charts are designed	Design
Old data is converted to new system format	Implementation
Program flowcharts are designed	Design

4	(a)		Problem 1: risk of hacking Precaution: use of firewalls/ data encryption/access levels Problem 2: virus infection Protection: installation of up-to date anti-virus programs
	(b)		Use of regularly changed passwords Access levels by defining different user Ids Use of file encryptions to make data unreadable Physical security Firewalls Biometrical security
5	(a)		**Software** Internet access software Communication software Echo-cancelation software CODEC software Data compression software Graphics software
	(b)		**Hardware** Webcam Video camera Microphone Loud speakers High Resolution monitors - MODEM - ISDN Video cards Sound cards Smart phones
	(c)		e-mail software instant messaging social network platforms e.g. whatsup fax

6	(a)		**Real Time Transactions** An individual transaction is processed as it occurs Records are updated immediately c.g. to avoid double booking of scats Very fast response It involves user interaction Files/database immediately updated after transaction **Real Time Process Control** Physical quantities continuously monitored by sensors, no human intervention Inputs are compared with preset values and quickly processed Signals arc converted by ADC or by DAC c.g. controlling temperature by air conditioning system - No updates are done on database
	(b)		Program loading and running File management Memory management Error and interrupt handling Logging resources Multi-programming File security maintenance Control of input/output devices
7	(a)		W: User interface X: inference engine
	(b)		Y: Expert system shell Z: Knowledge base Rule base/Heuristics
	(0		**Advantages** Problem solving time reduced More knowledge than a single expert More accurate in decision making Has permanence of information - does not forget Copies can be produced at a low cost Cheaper than consulting an expert Consulted any time of the day Consistent decisions given Eases shortages of experts in a field **Disadvantages** Expensive to set up Lacks creativity Lacks sensory experience /has no emotions People may not trust decisions made by a machine May not contain recent facts/updatcd information

(d)

Applications of expert systems

Medical diagnosis.
Mineral prospecting- to find oil and mineral deposits.
Game playing c.g. chess.
Weather forecasting.
Tax calculations.
Financial services- e.g. predicting the stock market as well as giving financial advice.
Car fault diagnosis.
Criminology or in forensic science.
Career choices/guidance.
Animal/plant classifications.

8

(a)

COUNT	NUMBER	TOTAL	X	AVERAGE	OUTPUT
1		0	0		
2	15	15	1		
3	-2				
4	8	23	2		
5	0				
6	2	25	3	8.3	8.3

(b)

To find the average of all positive numbers in a given set of values

9

A	B	*A*	A.B	*A*	X
0	0	1	0	0	0
0	1	1	0	1	1
1	0	0	0	0	0
1	1	0	1	0	1

10	**(a)**		Enlargement of designs/ designs can be scaled up/down Allows 3D viewing of designs Has a library of designs parts for customisation of designs Designs can be rotated to be viewed from different angles Allows simulation testing of designs Allows auto-calculation of quantities and cost of materials Easy modification of designs Designs can be quickly reproduced Reduction in paper costs Designs can be zoomed in/out Can be linked to CAM during manufacture of designed objects Easy integration with other packages Cropping of images
	(b)		It is expensive to set up a CAD system - c.g. the CAD software as well as the hardware is expensive. One needs to undergo thorough training to be able to use the CAD software. Risk of deskilling/unemployment. Can move work oversecs/electronic scabbing. Cannot replace pen and paper during early stages of design concept formation
	(c)		**Input devices** Light pcn/mousc - Graphic tablet Scanner Digital camera - Keyboard tracker ball **Output Devices** High resolution screen Graphics plotter - 3D laser printer
11	**(a)**		Code B
	(b)		- They are easier to learn and understand, since they resemble human language. They require less time to write. They arc portable i.e. a program developed in high level language can be run on any computer. They are problem oriented rather than ‘machine’ based. They are easier to maintain. They are easier to debug. Debugging is the process of removing errors (bugs) in a program. - They are less error prone due to less rigid syntax rules. They are user friendly (closer to human language). Programmers do not have to learn a new language for each computer they program

(c)

Have direct control over hardware
Have a one-to-one relationship with machine code
Programs arc faster to execute
Protects programs from alteration
Programs use less memory
Understandable by a computer

(d)

Compilers produce object code that can be saved on a disk.
- Object code can be transferred and run on other machines
Compiled programs are faster to execute - already in machine code form
Appropriate for very large problems

(e)

Modules are easy to write.
Modules are easy to understand.
Modules arc easy to debug (remove errors).
Modules are easy to modify/update.
Modules can be tested individually.
Modules are easier to maintain.
Modules can be re-used in the development of other programs.
Large tasks are broken down into smaller simpler tasks.
Top down design gives an orderly approach to programming.
With modules, it's easier to assess the progress of a large project, e.g. by counting the number of completed modules.
Programs can be written quickly as it is possible to involve many programmers at the same time.

(f)

Repeat - until	**While—Endwhile**
Bottom tested/ condition tested after loop entry	Top-tested, condition is tested on entry
Loop statements executed at least once	Loop statements may not be executed when condition evaluates to false

(g)

1. Standard/Normal data - data within set limits/rangc and is accepted and processed by program.
2. Extreme/borderline data-data at the boundaries and is processed by program
3. Abnormal/erroneous data - data outside set limits/range unacceptable to the program

12 **(a)**

- Personal data must be up to date.
- Personal data must be accurate.
- Personal data must be processed fairly and lawfully.
- Personal data must be held securely.
- Personal data must be protected from accidental damage.
- Only authorized users can have access to the data.
- Personal data must be deleted/destroyed when no longer required.
- Personal data can only be used for the purpose for which it was collected.
- Personal data should not be passed to a third part without owner's permission.
- Data users must register what data is used or is stored.

	(b)		Account holder's name Account holder's address Account holder's phone number Account holder's national ID Account holder's date of birth Account holder's employment details Account holder's account type Account holder's gender Account holder's next of kin details Account holder's photo
	(c)		**Update Reason** Change in customer details e.g. address, phone number Change in account balance e.g. after deposit/withdrawal **Update process** Searching customer's file to locate customer records and retrieving it into main memory Modifying customer details in memory Saving updated customer record and closing file

ZIMBABWE SCHOOL **EXAMINATIONS COUNCIL**

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/1

PAPER 1 Multiple Choice

NOVEMBER 2017 SESSION **1 hour**

Additional materials:
Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended);

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question, there are four possible answers, A, **B,** C and D. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet provided.

Read very' carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES
Each correct answer will score **one** mark. A mark will **not** be deducted for a wrong answer.
Any rough working should be done in this booklet.

This question paper consists of 11 printed pages and 1 blank page.

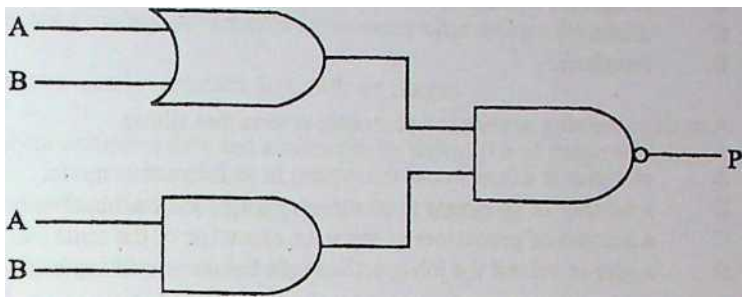
The CPU component that has the functions of fetching, decoding and executing instructions is the

A arithmetic logic unit.
B control unit.
C memory register.
D systems clock.

The time taken dowfflpad a 256 kilobyte file from an internet website when the data transfer speed is 9 600 bits/sec is /

A 3.64 minutes.
B 3.56 minutes.
C 4.55 minutes.
D 0.44 minutes.

The diagram below represents a simple logic circuit that receives inputs A and B and produces output P.



The truth table that represents the outputs from the logic circuit is

A	B	P
0	0	1
0	1	1
1	0	1
1	1	1

A	B	P
0	0	1
0	1	1
1	0	1
1	1	0

A	B	P
0	0	0
0	1	1
1	0	1
1	1	1

A	B	p
0	0	0
0	1	0
1	0	0
1	1	1

The entire logic circuit in **Question 3** can be replaced by

A an AND gate.
B an OR gate.
C a NAND gate.
D a NOR gate.

5 The electronic component that has been the key to recent development is the

A improved vacuum.
B integrated circuit.
C diode.
D transistor.

6 A multiprocessing system is a computer system that allows

A one user at a time to use the system in an interactive mode.
B a number of programs to be run at apparently the same time.
C a number of processors to share the execution of the same job.
D a user to submit the job specifications before processing begins.

7 An electronic point of sale system that uses automatic stock control provides the following sendees **except**

A an automatic products stock update.
B a reminder report on goods running out of stock.
C a report on products stock level.
D an account balance for EFTPOS customers.

8 Which aspect is **not** an advantage of CAD software used by engineers to design structures?

A CAD does not take time to learn and use efficiently.
B CAD designs can be computer simulated and tested.
C CAD can automatically calculate the bill of quantities from the designs.
D CAD can be linked to CAM to manufacture objects from the designs.

9 A computer is used to make sure that the drugs being manufactured have precise ingredients.

The use of a computer in this application is called

A simulation.
B modelling.
C process control.
D data logging.

10 A chemical manufacturing company wishes to purchase a computer that could

(i) monitor a variety of variables at the same time using sensors

(ii) compare sensor collected data with set ranges

(iii) analyse collected data and automatically adjust out of range variables

(iv) provide feed back on adjustments made to variables

Which system would be recommended?

A an embedded control system
B a data logging system
C an artificial intelligence system
D a process control system

11 Which process is controlled by a computer?

A robot operation
B weather forecasting
C data logging
D economic modelling

12 The operations of most household appliances are now being controlled by microprocessors.

The microprocessors in these appliances are called

A data logging systems.
B process control systems.
C embedded systems.
D interactive systems.

13 Which computer system is **not** likely to use artificial intelligence to determine outputs or provide decisions?

A expert systems
B virtual reality
C computer simulations
D computer chess games

14 An examination board uses e-marking to assess candidates' examination performance. Handwritten answer scripts are scanned and uploaded into the computer.

The computer is used to identify what has been written by candidates through the use of

A optical mark reading
B optical character recognition
C magnetic ink character recognition
D text-to-text speech translation

15 The job that is carried out by the systems analyst during the development of a new system is

A converting current data to a format suitable for the new system.
B supervising and controlling the use of tire implemented system.
C coding and testing software for the new system.
D leading and coordinating the development of the new system.

16 Which is the positive impact of introducing computers at a workplace?

A de-skilling of workers
B retrenchment of workers
C retraining of workers
D loss of job status

17 A computer user who spends long hours capturing data complains of backaches.

The best advice that could be given to the user is to

A use ergonomically designed desk.
B use ergonomically designed keyboard.
C take regular breaks from computer use.
D take medication and continue the data capturing.

18 The data security measure that reduces chances of virus problems in a network is

A backing up data regularly.
B setting up antivirus programs and firewalls.
C encrypting stored files.
D setting up passwords and file restrictions.

19 Which one would improve computer performance?

A using a large monitor
B increasing the size of RAM

C increasing the number of applications running
D usingafasterprinter

20 Which regulation is not part of the Data Protection Act?

A Personal data may be disclosed for National Statistical purposes.
B Permission must be sought for disclosure of personal data to a third party.
C Personal data must be collected and used for lawful purposes.
D Data subject forfeits rights to personal data once under control of data user.

21 Which of the following aspects is likely to take place during the investigation stage of systems development?

A designing user interfaces
B examining existing documents
C writing program specifications
D training of staff

22 When planning a project, staffing issues are principally addressed during

A design.
B analysis.
C staff training.
D feasibility study.

23 V.hen a software is developed, it goes through a number of testing stages.

The testing of the software by a selected group of trusted customers is called

A beta testing.
B alpha testing.
C module testing.
D system testing.

24 The following are part of technical documentation except

A program listing.
B tutorials.
C algorithms.
D test data.

25 An organisation has engaged a systems analyst to change its manual system to a computerised system. The systems analyst is yet to decide on which fact finding method to use in order to collect data that would give a clear understanding of the operations of the current system.

Which fact finding method would be recommended to the systems analyst to use?

A distributing questionnaires to workers v
B interviewing selected group of workers **C** observing workers in their daily operations
D studying and analyzing existing paperwork

26 The correct sequence in testing software from its development up to the time of releasing the final version for marketing is

A module testing; beta testing; bench testing; alpha testing.
B module testing; alpha testing; beta testing; bench testing.
C bench testing; module testing; alpha testing; beta testing.
D alpha testing; beta testing; module testing; bench testing.

27 A pseudocode structure that allows a group of statements in a loop to be executed at least once and tests condition after entry is the

A IF...ELSEIF...ENDIF construct.
B WHILE... ENDWHILE construct.
C REPEAT... UNTIL construct.
D FOR... NEXT FOR construct.

28 Which program error is likely to cause an executing program to terminate prematurely without producing expected results?

A type mismatch
B division by zero
C incorrect comparison of variables
D incorrect program statements arrangement

29 Which statement is not compatible with compilers?

A source code is translated every time the program is run
B produces an object code that can be saved on the disk
C object code can be transferred and run without the source code
D amending source code requires recompilation of the source code

30 Which one is an example of a programming language that is likely to be used when coding artificial intelligence programs?

A Java script
B visual basic
C fortran
D prolog

31 Assembly language is an example of a low level language used to write operating system software.

Which one is not a reason for writing operating system programs using low level languages?

A faster to code.
B faster to execute.
C enhance security to programs.
D direct control over hardware. /

32 The most likely reason for the existence of different high level languages is that they are

A machine dependent.
B hardware dependent.
C problem oriented.
D easier to code programs with.

33 The following is an algorithm:

```
1    Exponent = 0
2    REPEAT
3        RESULT = 2 ^ exponent [^ means 'power of]
4        PRINT RESULT
5        Exponent = Exponent +1
6    UNTIL RESULT <30
```

Dry running the algorithm caused a problem because

A endless looping resulted in no output.

B endless looping resulted in an overflow error.
C the variable exponent was incorrectly incremented.
D PRINT statement should have been outside the loop.

<5

34 Statement 6 in Question 33 pseudocode was changed to

until result >30

and the PRINT statement was placed outside the loop after the UNTIL statement. Following these changes, the output from the algorithm would be

A 32.
B 30.
C 16.
D 64.

35 The network protocol that allows files to be loaded from an internet website is

A an HTTP.
B an FTP.
C a TELNET.
D a VOIP.

36 A computer network with a central server to which all work stations are connected is called a

A ring network.
B bus network.
C mesh network
D star network.

37 An inquiry on the internet using a search engine produces too many 'hits' for the user. The user can reduce the number of'hits' by using

A a different search engine.
B fewer words on the search item.
C quotes on the search item.
D a web browser program.

38 Use of mobile phones in e-banking is now on the increase. One of the aspects that a user of a mobile phone in e-banking should be particularly concerned about is

A account details being hacked and used fraudlently.
B phone bills increasing when using e-banking.
C increased profits to the bank.
D retrenchment of bank tellers.

39 All car registration codes in Zimbabwe are required to have 3 letters followed by 4 digits with no omission. The suitable input mask to validate the data on entry to the database would be

A AAA9999.
B AAA(f>(|><j)(t>.
C LLL9999.
D LLL<j>4>(})<|).

40 In the spreadsheet below, a user attempted to calculate the prices of items at 120% of the cost using the formula = Al * B3 in C3 copied down to C5.

	A	B	C
1	120%		
2	Item	Cost	Price
3	Bread	0.80	0.96
4	Sugar	1.70	#Value!
5	Rice	1.55	SValue!

When the formula was copied from C3 down to C5, an error occurred in cells C4 and C5 as shown.

The solution to this problem is to use the formula

A = Al *B3 in C3 and copy down to C5
B = A$ 1 *B3 in C3 and copy down to C5
C = Al *$B3 in C3 and copy down to C5
D = Al *$B#3 in C3 and copy down to C5

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GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE	NOV 2017	4021/1

1	B
2	A
3	B
4	C
5	B
6	C
7	D
8	A
9	C
10	D
11	A
12	C
13	B
14	B
15	D
16	C
17	C
18	B
19	B
20	C

21	B
22	D
23	A
24	B
25	C
26	C
27	C
28	B
29	A
30	D
31	A
32	C
33	D
34	C
35	B
36	D
37	B
38	A
39	C
40	B

Surname	Forename(s)	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER STUDIES 7014/2
PAPER 2

NOVEMBER 2017 SESSION 2 hours 30 minutes

Candidates answer on the question paper
No additional materials are required

TIME: 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions
Write your answers in the spaces provided on the question paper

INFORMATION FOR CANDIDATES
The number of marks is given in brackets [ ] at the end of each question or part question.

This question paper consists of 17 printed pages and 2 blank pages.

[Turn over

For Examiner's Use

For Examiner Use

1. By giving suitable examples where appropriate, explain the meaning of the following terms.

(a) Hacking

_____

_____

_____

_____[2]

(b) Encryption

_____

_____

_____

_____[2]

(c) Simulation

_____

_____

_____

_____[2]

(d) Multiprogramming

_____

_____

_____

_____[2]

(e) Array

_____

_____

_____

_____[2]

For Examiner's Use

(f) De-skilling

_____

_____

_____ [2]

(g) Check-digit

_____

_____

_____

_____[2]

(h) Electronic Scabbing

_____

_____

_____[2]

2. **(a)** Illustrate, using labelled diagrams, the following logic gates:

For Examiner' Use

[For the OR and AND gate, use *x*,*y* as inputs and *z* as output.

For the NOT gate use A as input and B as output]

(i) AND gate

|**2**|

(ii) OR gate

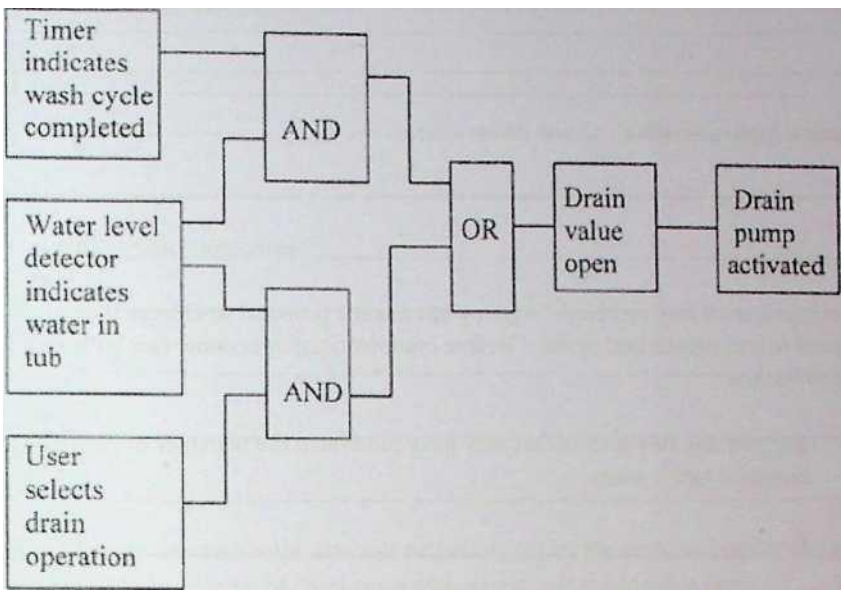
|**2]**

(iii) NOT gate

[2]

(b) A washing machine has a logic circuit set up as follows:

For Examiner's Use



Describe what happens if the

(i) User selects "drain" but there is no water in the tub,

_____ _ _____ HI

(ii) Wash cycle is completed and there is water in the tub.

_____ __ 11]

(iii) Wash cycle is completed, there is **no** water in the tub and the user selects the drain operation,

[1]

(iv) Wash cycle is completed and there is no water in the tub.

For Examiner; Use

HI

(e) Name a logic gate which acts as an inverter.

[1]

3. The manager of Day and Night Agency has made a proposal to change their manual payroll to a computerised system. Before computerisation is done, fact gathering has to be done.

(a) Suggest any **two** factors that may have motivated the manager to suggest for a computerised system.

1.

2.

[2]

(b) Describe the following fact gathering methods:

(i) Interviews

121

(ii) Observation

For Examiner's Use

_____ **[2]**

(iii) Questionnaires _____

_____

_____

_____ **[21**

(c) Identify any **two** roles that will be performed by the systems analyst during the whole process of coming up with a new computerised system.

1. _____

_____

2. _____

_____

_____ **[2]**

(d) Arrange the following first four stages of the systems development life cycle in their correct order:

For Examiner; Use

Fact finding, analysis, feasibility study, problem identification.

1. _____

2. _____

3. _____

4. _____ **[4]**

(e) **(i)** Differentiate between user and technical documentation.

_____

_____

_____

_____ [21

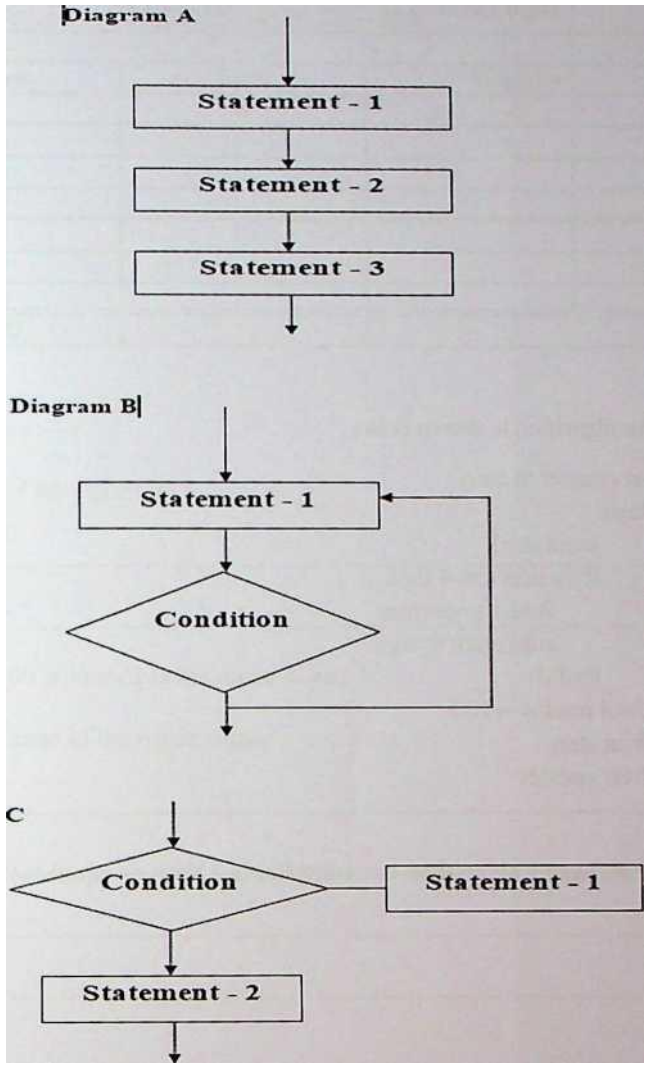
(ii) State **one** item included in the technical documentation

_____

HI

(a) The following flowcharts represent three program constructs

For Examiner's Use



Name the program construct represented by **diagram**

1. **A .Jll**

2. **B_____[1|**

3. **C_____[11**

(b) Give any **three** differences between a high level language and machine code

For Examiner's Use

	High Level	**Low Level**
1		
2		
3		

[31

(c) An algorithm is shown below.

```
Set counter to zero
Begin
    Input mark
    If counter<= 4 then
        Add 1 to counter
        Add mark to sum
    End if
Until mark= —100
Print sum
Print counter
```

|NB: in this algorithm <= 4 implies less than or equal to]

(i) Complete the trace table for the algorithm using the following set of marks:

For Examiner's Use

25,20,23,24,20,30,-100

Mark	Sum	Counter
	0	0
25		
20		
23		
24		
20		
30		
-100		

[5]

(ii) State the use of the algorithm.

HI__

(iii) The mark —100 is known as the rogue value.

State any two uses of the rogue value.

1. _____

_____

2. _____

_____ [21

(f) **(i)** State any **two** examples of fourth generation programming languages.

For Examincr'i Use

_____|2|

(ii) State and explain any **one** example of program errors

_____

_____

_____

12]

(g) Explain the purpose of an interpreter

_____

_____

[2|

5. A company uses e-mail to communicate with its officers in different geographical sites using WAN. The company also uses WLAN for offices in the same building. Each of the managers in company has a company mobile phone to use for various transactions.

For Examiner's Use

(a) State what the acronyms below stand for:

1. WAN_____

_____

2. WLAN_____ _____ _____

_R]

(b) **(i)** State any **two** communication media which can be used by WAN.

2- [21___

(ii) Give any **two** advantages of using WLAN.

2-____[2]

(iii) State **one** use of a mail box in an e-mail communication.

_____

_____[2

(iv) State the importance of passwords in e-mail communication.

For Examiner') Use

[21

(v) A parent is concerned about the effects of social networks on his child.

Identify **two** items of advice you would give to the parent and/or to the child to reduce the negative effects of social networks such as Whatsapp.

1. _____

|2]

6. (a) Explain the meaning of the term *robotics.*

[2]

(b) All robots have the same basic components.

For Examiner's Use

Give any two of these components describing the use of each.

Component 1_____

Use_____

Component 2_____

Use **[4]**

(c) Give any **four** reasons why the use of robots has gained popularity in various industries.

1. _____

2. _____

3. _____

_____

4.

[4]

(d) Give any **two** disadvantages of the use of robots in society.

1. _____

_____

2. _____

_____ **[21**

7. **(a) (i) D** and R service station has purchased a set of ten computers for use in its ICT Department. They need to hire a computer professional for initial set up.

For Examiner'i Use

Name the type of specialist for the job.

_____ _____ __ _____ 111

(ii) State any **four** ICT employment posts that arc created by the introduction of computers at D and R service station.

1. _____ _____

2.

3.

141

(b) D and S Service Station needs to protect data held on its computers against corruption, theft or accidental loss.

(i) Identify any **two** ways data on the computers would get corrupted

2.

[2]

(ii) Explain any **one** method the company would use to recover its data after corruption.

For Examiner's Use

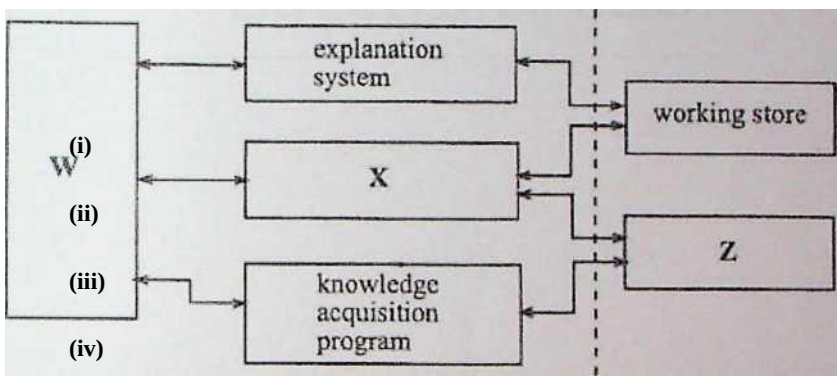
_____

_____

_____

_____ **12]**

8. The following diagram shows a typical expert system.



(a) Identify the missing labels **W, X, Y, Z** using the following list of possible options.

Inference engine, knowledge base, user-inference, expert system shell

W _____

X _____

Y _____ _____

Z _____ **[4]**

(b) During consultation of a medical expert system, wrong diagnosis was given to a doctor. Suggest **four** probable causes why a wrong diagnosis was given.

For Examiner') Use

2.

3.

4.

[4]

ZIMBABWE SCHOOL EXAMINATION COUNCIL

General Certificate of Education Ordinary Level

EXPECTED ANSWERS

NOVEMBER 2017

COMPUTER SCIENCE 4021/2

(a) **Hacking** - refers to the gaining of illegal/unauthorized access/entry into computer systems by cracking passwords.

(b) **Encryption** - Scrambling of computer data into unreadable form to prevent it from being read by illegal users e.g. hackers.

(c) **Simulation** is the process of studying the behaviour or characteristics of a real system using a model e.g. flight simulator

(d) **Multiprogramming** - is the process of running/executing two or more programs concurrcntly/at the same time in computer memory.

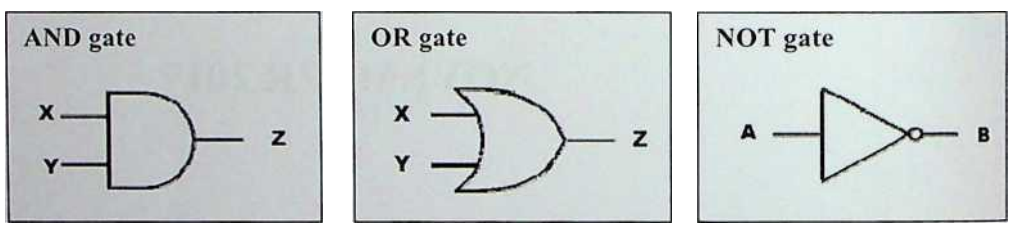
(e) **Array** - is a homogenous set of elements under a single data name e.g. a list of numbers

(0 **De-skilling** - loss of work related skill due to computerisation

(g) **Check-digit** - is a value or character appended/added at the end of a numeric code to check the validity of the code on transcription.

(h) **Electronic scabbing** - Is when organizations use their private networks (Intranets) to transfei computer duties e.g. word processing duties, from a branch in one country with striking workers or increased workload to a branch in another country with non-striking workers sc that work continues or the workload is reduced.

(a)



(b) **(>)** Drain value not opened and drain pump not activated, no action is taken.

(ii) Drain value is opened, drain pump activated/started

(iii) Drain value not opened, drain pump not activated - there is no action

(iv) Drain value not opened, drain pump not activated - there is no action

(c) NOT gate

3	(a)		Manual system is now too slow More through put Less staff will be necdcd/rcducc wage bill Efficient back up of data More security of employee salaries through use of passwords Less errors during payroll processing Less storage space needed Less stationery needed. Technological advancement rendering the current system unsuitable
	(b)	(i)	**Interviews** An inteiwiew is a one to one question and answer session between the system analyst and the user. Interviews take place face-to-face and usually involve more detailed questions than questionnaires. During interviews facts about what is happening come to light, together with the opinions of the interviewee regarding weaknesses in the system.
		(ii)	**Observing** The observation method involves watching the workers using the system so as to find out exactly how it works. The system analyst will be mainly interested in observing how the data is input, processed and output as well as how reports are generated. Personal observation also allows you to verify statements made in interviews and determine whether procedures really operate as they are described.
		(iii)	**Questionnaire** A questionnaire is a document containing a number of standard questions that can be sent to users so as to find out their views of the existing system. - Questionnaires usually forms on more simple questions and are completed by ticking or circling options or shading boxes. In projects where it is desirable to obtain input from a large number of people, a questionnaire can be a valuable tool. The questionnaire will contain questions that are designed to extract usefill information about the current/proposed system.
	(c)		Feasibility study Carrying out problem identification Carrying out data gathering Coming up with a requirements specification Carrying out system design Documentation of system Training of users
	(d)		1. Problem identification 2. Fact finding 3. Feasibility study 4. System analysis

	(e)	**(i)**	User documentation - is an explanation of what the program does, how it operates and it's meant for the users of the system. Technical documentation - is an explanation of how a program works and is meant for technical personnel such as programmers/
		(ii)	Typical content of the Technical documentation includes: Purpose of the system - description of the problem that the system solves. Hardware requirements - list of hardware needed to run the system (CPU speeds, minimum hard disk space, and RAM size). System requirements — types of OS the system can run on. System flow charts - shows how data will flow through the system. File structures (table) used - this will include field names, data types and relationships between tables. Programming languages used to code the system - Java, C, VB.net Details of system bugs Input formats - what kind of data will the system accept? Output formats - what kind of data can the system produce? Validation rules - description of each error control method and the reasons behind including each one. -. Meanings of error messages - descriptions of what system error messages mean and how to respond to them. Testing information - test plans, test data and results of the tests.
4	**(a)**		**A** - Sequence/Linear **B** - Iteration/Looping/Rcpetition **C** - Decision/Selection
	(b)		

High Level Language	**Low Level Language**
Problem oriented	Machine oriented
Needs an interpreter/compiler	No need for interpreter or compiler
portable	Not portable
Consists of English like statements	Consists of zeros and ones
Easy to write	Difficult to write
Occupies more memory	Occupies less memory
Not secured	secured

(0

Mark	Sum	Counter
	0	0
25	25	1
20	45	2
23	68	**3**
24	92	4
20	112	5
30	112	5
-100	112	5

(ii) To find the sum of the first 5 marks

(iii)
1. To terminate further data entry
2. To terminate the loop

(d) (i)

Java
- C++

Delphi
- PHP

Visual basic
Visual C sharp
Javascript
Python

(ii) Syntax error - results from violating the grammatical rules of a programming language.

Logical error - a flow error in the sense of a program which makes it produce wrong results/output

Runtime/execution error - errors encountered during the running/execution of a program

Semantic error - error due to improper use of program statements.

(e) To convert high level languagc/source code to low level language/object code, line by line during program execution.

5	**(a)**		**1.** WAN - Wide Area Network **2.** WLAN - Wireless Local Area Network
	(b)	**(i)**	Satellite link Optical fibre Telephone Line Microwave Link Radio Signal
	(c)	**(ii)**	**Advantages of WLAN** It is easier to add or move workstations. It is easier to provide connectivity in areas where it is difficult to lay cable. Installation can be fast and easy and can eliminate the need to pull cable through walls and ceilings. Access to the network can be from anywhere within range of an access point. Portable or semi-permanent buildings can be connected using a wireless LAN. While the initial investment required for wireless LAN hardware can be similar to the cost of wired LAN hardware, installation expenses can be significantly lower. Where the offices are located on more than one site (such as on two sides of a road), it is possible with directional antennae, to avoid digging trenches under roads to connect the sites. In historic buildings where traditional cabling would compromise the faqade, a wireless LAN can avoid drilling holes in walls.
		(iii)	To store messages To avoid unauthorised access
		(iv)	Not to associate with strangers
		(v)	- Not allocating them too much money to buy bundle for social network Random checks on associates on social networks Monitor content being accessed Limit time of access

6	(a)		Robotics is the study and design of machines to perform human manual tasks by programming the machines.
	(b)		**1. Sensors** - they are responsible for collecting data from the external environment **2. Actuators** - - the actuators are the motors in the robot body that are used to create and control motion of the robot or the robot's parts such as manipulators. **3. Microprocessor** - this is the "brain" of the robot. All the instructions/programs which control the robot are stored in the controller. **4. Power supply** - the function of the power supply is to provide and regulate energy that is needed for a robot to operate. **5. End effectors (end of arm tooling) -** it is the device that is mechanically opened and closed and docs all the tasks such as gripping, welding etc. **6. The manipulator** - it is the name for the long, jointed ami and wrist of a robot. It just operates more like the human arm. Its main function is to provide the specific movements that will enable the end effectors to do the required work
	(c)		**Reasons why robots have gained popularity** Robots can perform tasks faster than humans, thus they are more efficient. Robots can perforin tasks more accurately and consistently than humans. Robots can work 24 hours a day with no salary or food. Robots reduce wage bills as fewer work forces will be needed. Robots can perform those tasks that are repetitive and tedious to humans. Robots can be made to perform tasks which arc too risk for humans such as removing bombs in landmines, cleaning nuclear reactor plants or even in fire fighting missions. Robots don't get bored / hate their job!
	(d)		**Disadvantages of using robots** People can lose jobs in factories since most tasks will be performed by robots. People are **deskilled** (this means that, because the robots are doing the complex, skilled tasks that the people used to do, the people are left doing simple, boring jobs). A robot needs a supply of power. A robot needs maintenance to keep it running. It costs money to make or buy a robot. Robots cannot respond to situations that may require creativity or common sense (a human user tends to notice obvious errors, whereas a robot wouldn't). - Some robots especially in industry can harm other workers. A heavy robot for example can step on a human's foot or fall on a human.

7	**(a)**	**(i)**	Hardware/software technician - Network technician
		(ii)	Data capture clerk Systems administrator/analyst Hardware technician Software engineer Database administrator
	(b)	**(i)**	Through viruses - viruses can corrupt files Through hacking - hackers can deliberately corrupt data Operator error Hardware failure Software failure
		(ii)	Back up File generations Use of recovery software Cloud computing Use of up to date antivirus
8	**(a)**	**(i)**	**w** - user interface
		(ii)	**X** - inference engine
		(iii)	**Y** - expert system shell
		(iv)	**Z** - knowledge base
	(b)		Errors in the knowledge base Incorrect inputs given/faulty sensor Knowledge base not up to date with current facts Error in the rule base Faulty in the inference engine Viruses hacking

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER SCIENCE 4021/1

PAPER 1 Multiple Choice

NOVEMBER 2018 SESSION 1 hour

Additional materials:
- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended.)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do **not** open this booklet until you are told to do so.

Write your name, centre number and candidate number on the answer sheets in the spaces provided unless this has already been done for you.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score **one** mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

There are **forty** questions in this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the one you consider correct and record choice in soft pencil on the separate answer sheet provided.

This question paper consists of 8 printed pages.

1 Which of the following is **not** a benefit of modular programming?

A It increases program readability
B It increases program productivity.
C It allows for the creation of a library of common programming tasks.
D It allows one programmer to do the job of many in the same amount of time.

2 The Arithmetic Logic Unit performs one of the following

A storage of data.
B sending control signals to peripheral devices.
C comparison of data.
D monitoring **I/O** devices if they need CPUtime.

3 Which role in the IT department best suits a secretary?

A Systems Analyst
B Database Administrator
C Network Administrator
D Data Capture Clerk

4 A District Development Council wants to design and build a new bridge. Which one is the most appropriate software to use in the design?

A Systems software
B DTP application
C CAM application
D CAD application

5 Web pages contain instructions about how the text is to be displayed. The instructions are embedded in the page as

A anchors.
B hyperlinks.
C tags.
D frames.

6 An intranet is best defined as

A a network that is shared by more than one organisation.
B a network using e-mail and web within a single organisation.
C a network which can only be accessed using an ISP.
D a world-wide collection of computer files connected by links.

7 **A** device which allows a computer or a terminal to use a telephone line in communication is called a

A digitizer.
B modem.
C fax machine.
D print server.

8 Which type of data is used to test a program for values outside a given range?

A standard data.
B abnormal data.
C extreme data.
D live data.

9 Which of the following items constitute the implementation stage?

A training of staff.
B designing validation methods.
C setting out a testing strategy.
D studying the existing system.

10 What type of sensor would be used to collect the data in an experiment using a data logger to investigate the rate at which boiling water cools in a science laboratory?

A pressure
B sound
C temperature
D light

11 When planning a project, staffing issues will be principally addressed in the

A feasibility study.
B maintenance phase.
C design.
D analysis.

12 Which of the following is safe to post on a social networking site?

A your location.
B your birthday.
C an alias.
D a picture of you with your friends.

13 Which of the following is not a principle of structured programming?

A design the program in top-down manner.
B write each program module as a series of control structures.
C code the program so that it runs correctly without testing.
D use good programming.

14 A diagram that represents an algorithm is

A a data flow diagram.
B a systems flow chart.
C an entity relation diagram.
D a program flow chart.

15 The NOR gate is a combination of the

A exclusive AND gates.
B two AND gates.
C NOT and AND gates.
D NOT and OR gates.

16 Business ethics deals primarily with

A social responsibility.
B the pricing of products and services.
C moral obligation.
D being unfair to the competition.

17 Which of the following is **not** a control structure?

A algorithm.
B repetitive.
C selection.
D sequential.

18 With reference to the Data Protection Act, personal data refers to

A data purchased by a person.
B data held by an individual for personal use only.
C data held by an organisation relating to an individual.
D data stored on one's personal computer.

19 People can only complain about the inaccuracy of data if

A it is held for "national security" purposes.
B they have suffered damage from it.
C it is on paper files.
D they can find out who is storing data about them.

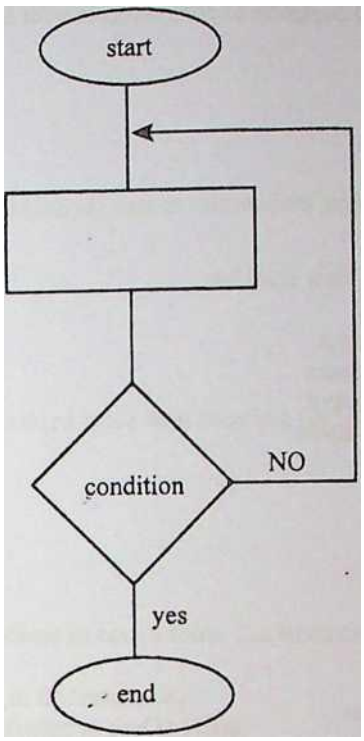
20 A virus scan should be done regularly on a computer to

A make virus weak and less harmful.
B create write protected files which cannot be infected by virus.
C create new files and folders which are free from virus.
D detect virus and remove it from the computer.

21 Which of the following would be recommended to prevent unauthorized access to data on a computer?

A creating username and password.
B creating back-up files.
C make use of an up to date anti-virus program.
D switching off the computer after use. Q

22



The programming construct above is a

A fixed.
B sequence.
C repetition.
D selection.

23 E-commerce is

A buying of electronics equipment from high street shops.
B requesting information from companies selling electronic equipment.
C advertising electronic goods on the internet.
D buying of goods and services and paying for them on-line.

24 Which one of these is a type of a network that links computers in different cities of countries?

A PSTN
B WAN
C MAN
D LAN

25 The software used to allow a computer to communicate with a peripheral such as a printer is called

A an application
B a driver.
C a utility.
D a protocol.

26 A decision box in a program flow chart has

A one input and one output.
E one input and two outputs.
C two inputs and one output.
D two inputs and two outputs.

27 77 converted to binary is

A 1011001.
B 1001101.
C 1100111.
D 1001001.

28 A scanner can be described as

A storage device.
B an output device only.
C an input and output device.
D an input device only.

29 A collection of 8 bits is called

A word.
B nibble.
C byte.
D record.

30 Social networking involves communication between

A two computers.
B a computer and a router.
C a human and a computer.
D two or more people.

31 A website makes use of multimedia. This means that it contains

A videos, pictures, text and sound.
B text and images.
C applets and scripts.
D hyperlinks and scripts.

32 In a database, related fields are grouped to form a

A field group.
B record.
C file.
D bank.

33 A network configuration in which all data or information pass through a central computer is

A multiplex.
B bus network.
C star network.
D duplex.

34 When the same data field is stored more than once in a file, then it leads to

A data dependency.
B data independency.
C data inconsistency.
D data redundancy.

35 Often data is stored in a database in coded form. An advantage of this is

A hackers are not able to understand it.
B it is easier for the software to sort the data.
C it does not need validating.
D it takes less storage space.

36 Which of the following devices determine the speed at which the computer operates?

A RAM
B ROM
C Processor.
D bus.

37 A program in machine language is called .....program.

A object
B computer
C assembly
D high level

38 Scheduling is

A the same regardless of the purpose of the output.
B allowing a job to use the processor.
C quite simple to implement, even on large main frame.
D unrelated performance consideration.

39 Which of the following is the ascending order of data hierarchy?

A bit - byte - record - field - database - file
B bit - byte -field - record - file - database
C bit - byte - file - field - record - database
D bit - record - byte - field - file - database

40 100101 converted to denary is

A 27.
B 31.
C 37.
D 49.

ZIMBABWE SCHOOL EXAMINATION COUNCIL
GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE **NOV 2018** **4021/1**

1	D
2	C
3	D
4	D
5	B
6	B
7	B
8	C
9	A
10	C
11	A
12	C
13	B
14	A
15	D
16	C
17	A
18	C
19	B
20	D

21	A
22	C
23	D
24	B
25	B
26	B
27	B
28	C
29	C
30	D
31	A
32	B
33	C
34	D
35	D
36	C
37	A
38	B
39	B
40	C

Candidate Name **Centre Number Candidate Number**

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER SCIENCE 4021/2

PAPER 2 Structured

NOVEMBER 2018 SESSION 2 hours 30 minutes

Candidates answer on the question paper. No additional materials are required. '

Allow candidates 5 minutes to count pages before the examination.

This booklet should not be punched or stapled and pages should not be removed.

TIME 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES .

Write your Name, Centre number and Candidate number in the spaces at the top of this page and your Centre number and Candidate number on the top right comer of every' page of this paper.

Answer **all** questions.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

This question paper consists of 14 printed pages and 2 blank pages.

Centre Number Candidate Number

1 **(a)** Define the terms below, giving **one** example.

(i) Hardware

P]

(ii) Software

[2]

(b) List any **three** functions of a computer operating system.

1.

X

2.

3. [3]

1 **(c)** Suggest any **three** applications of computers in agriculture.

1.

2.

3.

[3]

(d) State any **three** areas where super computers can be used.

1.

2.

3.

[3]

Centre Number Candidate Number

1
Define the term Geographical Information System.

_____

_____

_____

_____ [2]

(a) State five components of an expert system.

1. _____

2. _____

3. _____

4. _____

5. [5]

(a) Convert the following base 2 numbers to base 10.

(i) 111010

_____

_____

_____

HI

(ii) 101011

_____

_____

_____

in

(bi) Convert the following base 10 numbers to base 2.

(i) 76

93

(c) Using the boolean expression

AB + C = F,

(i) draw the corresponding logic diagram.

|3|

(c) (ii) Complete the Truth Table for **AB + C = F.**

A	**B**	**C**	**AB**	**C**	**AB+C**
0	0	o			
0	0	I			
0	I	o			
0	I	I			
I	0	0			
I	o	I			
I	I	0			
I	I	I			

[31

4 Explain in detail the following network devices.

(a) Router

[2]

(b) Switch

[2]

(b) Bridge

[2]

5 **(a)** Explain the difference between **data verification** and **data validation.**

12]

(b) Suggest any **three** measures to safeguard data against cybercrime.

1.

2.

3. [3]

(c) File permissions can be used as security measure.

List any **five** file permissions.

1.

2.

3.

(c) 4.

[5]

(a) Describe any three services provided by the internet.

1.

2.

3.

(b) Explain the following network protocols:

(i) HTTP

[1]

(ii) TCP /IP

(iii) VoIP

[1]

Describe the maintenance /review/evaluation stage of the system development life cycle.

7 (a)

[4]

Explain any **three** testing strategies that are used in the development and testing stage.

(b)

1.

[2]

Centre Number Candidate Number

7 **(b)** 2. _____

_____ [2]

3. _____

_____ [2]

8 **(a)** Compare and contrast the Repeat -—Until and While —- Endwhile statements.

_____

_____

_____

_____

[4]

(b) Using the two looping structures given in (a), draw the flow charts/ diagrams representing them.

(i) Repeat— Until While— Endwhile

11

9 State **three** properties of a database package.

1. _____

2. _____

3. [3]

10 A web page is made up of a number of essential parts, which contribute to the large whole.

Name any **four** essential parts of a web page.

1. _____

[6J

2. _____

3. _____

4. [4]

11 Explain any **three** types of errors in programming.

1. _____

_____

_____

_____

11 2. _____

_____

_____

_____

_____

_____

_____

_____ [5]

12 (a) The table below represents an extract from a student file from a certain college.

SURNAME	**FIRST NAME**	**REG. No.**	**SEX**	**DOB**	**AGE**	**ADD 1**	**ADD 2**	**ADD 2**
TOM	**JOHN**	**R001**	**M**	**20/03/83**	**16**	**T1 STR**	**BOX 72**	**MT RE**

Centre Number Candidate Number

ROSA	**JANE**	**ROO7**	**F**	**19/04/84**	**17**	**M2 STR**	**BAG 7**	**HRE**

(i) Identify giving reasons, the field which can be used as a primary key.

Primary Key_____

Reason_____

_____ **[2]**

13

(i) Suggest two reasons why the age field is not necessary

Reason 1 _____

_____

Reason 2_____

_____ [21

12 **(b)** Describe how to use the database in order to search for all students born before 1980.

_____

_____

_____

_____

_____

_____

_____

[31

13 **(a)** Explain the meaning of the term **business ethics.**

[31

13 (b) Identify any three attributes of business ethics.

1.

2.

3. [3J

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ZIMBABWE SCHOOL EXAMINATION COUNCIL

General Certificate of Education Ordinary Level

EXPECTED ANSWERS

NOVEMBER 2018

COMPUTER SCIENCE 4021/2

1	**(a)**	**(i)**	Hardware refers to the physical/tangible components of a computer system Examples: keyboard, mouse, scanner etc
		(ii)	Software is the set of programs that controls computer hardware or set of instruct ions to solve a certain problem. Example: application software or system software
	(b)		Provides a user interface. Control of input and output devices. Handling of interrupts. System security (c.g. handling of passwords). Memory management. File management. Job scheduling. Error reporting and handling. Maintain user accounts. Multitasking. Loading and running software. Utilities and support services (c.g. copy, save, rename etc)
	(c)		Keeping farm records Inventory management Preparation of stock fields Automated farm equipment e.g. automated greenhouses Collection of spatial data e.g. GIS e-commerce sharing of information through social networks and discussion forums
	(d)		Weather forecasting. - Electronic design. Stock analysis. Graphics animation Petroleum/nuclear research Molecular modelling - National security intelligence Scientific simulation and modelling. - Fluid dynamic calculations. Design of new drugs and chemical compounds. Used for research by government agencies and large universities Used by military for weapon and defence systems research
2	**(a)**		- GIS - is a system designed to capture, store, manipulate, analyse, manage and present spatial data/geographic data.
	(b)		Knowledge base Inference engine User interface Explanation system_____ _____

Rule base
Expert system shell

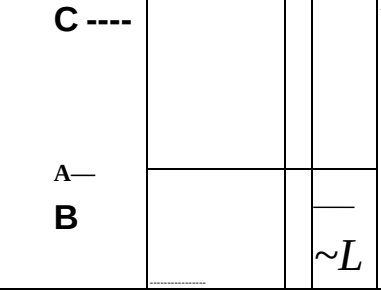
3 **(a)** **(i)** 58_{10}

(ii) 43_{10}

(b) **(i)** $1\ 001\ 100_2$

(ii)

(c) **(i)**



$1\ 001\ 100_2$

(ii)

A	B	C	AB	C	$AB + C$
0	0	0	0	1	1
0	0	1	0	0	0
0	1	0	0	1	I
0	1	1	0	0	0
1	0	0	0	1	1
1	0	1	0	0	0
1	1	0	1	I	1
1	1	1	1	0	1

4 **(a)**

Router

A router is an intelligent communication device that connects multiple network types and determines the best path for sending data.

The router once connected, can make intelligent decisions about how best to get network data to its destination based on network performance data that it gathers from the network itself.

Like bridges, routers can also segment large networks. However, they are slower than bridges because they are more intelligent devices; as such, they analyze every packet, causing packet-forwarding delays.

(b)

Switch

Can also be called a switching hub

It connects devises together on a computer network/LAN

- It uses packet switching to receive, process and forward data to the destination device.

A switch has a number ot ports and it stores the addresses of all devices that are directly

or indirectly connected to it on each port.
As a data packet comes into the switch, its destination address is examined and a direct connection is made between the two machines.

(c)

Bridge

A bridge is a network device that connects two similar network segments together and it also divide a busy network into two segments.
The primary function of a bridge is to keep traffic separated on both sides of the bridge. Traffic is allowed to pass through the bridge only if the transmission is intended for a station on the opposite side.
By keeping traffic on one side from crossing to the other side, bridges are often used to increase performance on a high-traffic segment.
For example, with 400 people on one network segment, performance will be mediocre, because of the number of workstations that are lighting to transmit.
If you divide the segment into two segments of 100 workstations each, the traffic will be much lower on cither side and performance will increase.

5 **(a)**

Data Verification	**Data Validation**
It ensures the correctness/accuracy of data	It ensures the sensibility/reasonableness of data
It is done manually by the user	It is done automatically by the computer
Done after initial data entry	Done during the initial data entry of data

(b)

User ID and passwords
Biometric authentication
Use of firewalls
Intrusion Detection Systems (IDS)
Data encryption
Up to date Antivirus software
Physical control methods e.g. locking rooms
Digital signature/certificatc
Use of call back facility
Audit logs
- Use of security policy
Use of smart cards

(c)

Read
- Write
Rcad/Writc
Modify (Delete, amend, edit)
Read and execute
Full Control

6	**(a)**		e-mail teleconferencing video conferencing view data (video text) teletext ecommerce c-banking facsimile file download and upload
	(b)	CO	**HTTP** HTTP stands for Hyper Text Transfer Protocol. It is the set of miles used to transfer data between computers and servers on the World Wide Web. Some of the common examples of files transferred through HTTP on the internet include text, graphics, images, sound, video and other multimedia files. **TCP/IP** TCP/IP stands for Transmission Control Protocol/Intemet Protocol .TCP/IP is the basic communication language or protocol of the internet. TCP/IP consists of two protocols i.c Transmission Control Protocol and Internet Protocol. IP makes sure that the packets get to the correct address and TCP ensures that all the packets arrive at the recipient computer without errors. **VoIP** VoIP stands for Voice Over Internet Protocol It is a technology that allows you to make telephone calls over a broadband internet connection.
7	**(a)**		Making upgrades Modifying Perfecting the system To correct the system To make it adapt to changing needs Updating hardware Updating software Ensure that the objectives of the system are met. Identify weaknesses and strength of the system
	(b)		Unit/Module testing -modules are coded independently and are tested individually to detect and rectify errors before they are used. - System testing - all modules and sub modules are tested as a single system and correct detected errors.

Acceptance testing - checking if simulated data meets the objectives and needs of the user.
Integration testing - testing related modules joined together to eliminate errors.

(a) **Similarities**

Both are looping structures

Differences

Repeat—until

Executed if condition is false until it is true

Loop body executed at least once

Post condition - condition tested after execution of loop body

Bottom tested/ condition tested after loop entry

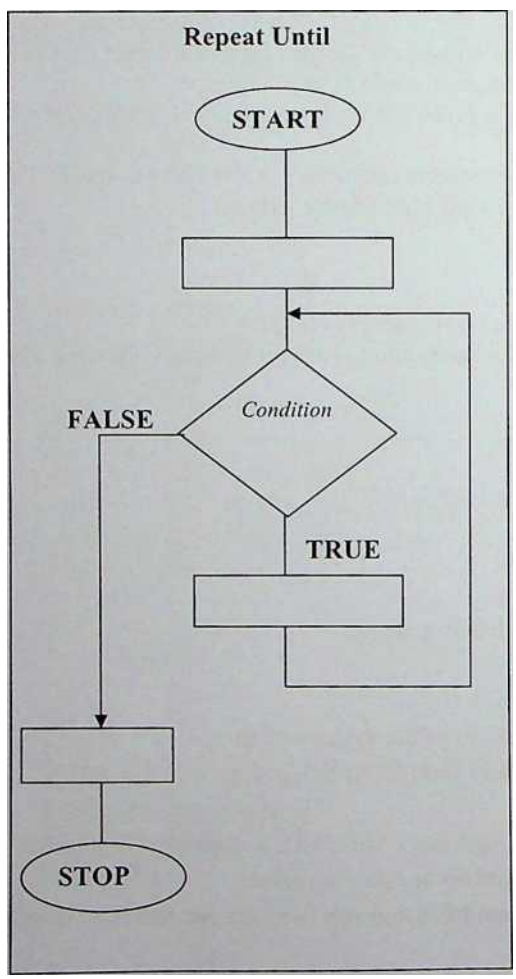
While—end while

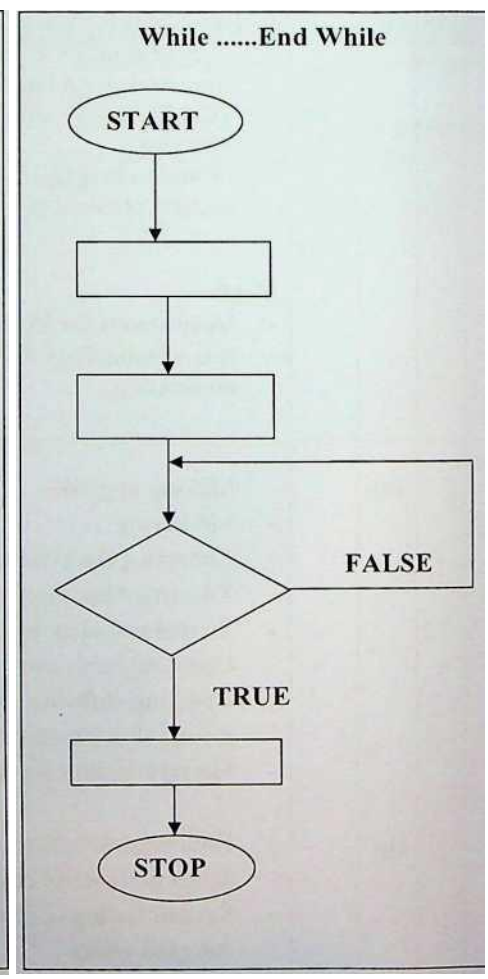
Executed if condition is tine until it is false

May not be executed at all

Pre condition - condition is tested before execut ion of loop body

Top-tested, condition is tested on entry





9			Restriction of unauthorised users Reduced data redundancy Backup and recovery Data atomicity Data sharing Data independence Report generation Multiple views Integrity constraints
10			Images and videos Headings Body content Navigation/hyperlinks Uniform Resource Locator Themes Search facility Animation Plug ins/add ins Credits
11	**(a)**		**1.** Syntax error - error due to violation of a programming language rules **2.** Semantic error - error due to improper use of program statements **3.** Logical errors - error due to wrong output **4.** Run time error - errors experienced during program execution
12	**(a)**	**(i)**	Reg No Reason: It's a unique identifier of a student
		(ii)	Age can be calculated using date of birth Not flexible, it might need to be constantly changed when one's age changes It causes data redundancy when someone's age changes and database not updated
	(b)		**1.** When using Microsoft access, in the criteria section under date of birth you can use the following command <01 /01 /1980 **2.** Using sql, use the command below *SELECT from* ***Student_table*** surname, firstname, regNo, DOB, Sex, Age,Address *WHERE DOB* <01/01/1980

13 (a) Business ethics - is the application of right moral conduct when carrying out business activities.
It is respecting business principles such as honesty, good governance, transparency, etc when doing business

(b)
Integrity
Trustworthiness
Loyalty
Fairness
Honesty
Hardworking/determination
Transparency
Customer care
Avoid discrimination
Concern for others
Respect for others
Law abiding
Confidentiality

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER SCIENCE

PAPER 1 Multiple Choice

4021/1

NOVEMBER 2019 SESSION

1 hour

Additional materials:

Multiple Choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There arc **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C** and **D.** Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet provided.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score **one** mark. A mark will **not** be deducted for a wrong answer. Any rough working should be done in this booklet.

This question paper consists of 11 printed pages and 1 blank page.

1. Devices that accept data from outside the computer and transfer into CPU are called

A peripheral devices.

B analogue devices.

C digital devices.

D input devices.

2. A network of computers and other devices that is confined to a relatively small space is called a

A Peer-to-peer Network.

B Local Area Network.

C Wide Area Network.

D Global Network.

3. Random Access Memory (RAM) is

A a type of permanent memory used by the computer to establish basic input and output.

B used to store files and programs temporarily for fast and easy access by the CPU.

C the most common way to connect additional components to the computer.

D the primary interface for the hard drive, CD ROM and floppy disk drive.

4. Which one of the following statements is correct?

A 1 KB = 1 024 bytes

B 1 MB = 2 048 bytes

C 1 MB = 1 000 bytes

D 1 KB = 1 000 bytes

5. A technology that allows telephone calls to be made over computer networks is a

A Modem.

B CDMA.

C VOIP.

D GSM.

6. In computer networking, a device used to connect two systems which use different protocols is called a

A repeater.

B gateway.

C bridge.

D modem.

7. If an instruction consists of an arithmetic operator, data is transferred to the

A central processing unit.

B arithmetic and logic unit.

C quantitative unit.

D qualitative unit.

8. The total for 32, 16,4, 2 and 1 represented in binary form is

A 110111.

B 111011.

C 111101.

D 1110001.

9. A binary variable can take values

A 0 only.

B 0 and 1.

C 0 and 2.

D Oand-1.

10. NOR is a complement of

A OR.

B AND.

C NOT.

D XOR.

11. A robot used by a car manufacturing company is an example of a machine which is

A applicant controlled.

B computer controlled.

C network controlled.

D user controlled.

12. In binary system, numbers with power of 2 are

A 2,4,8,26,32,64,128.

B 1,2,4,8,16,32,64.

C 2,4,6,8,10,12,14.

D 0,1,2,4,16,32.

13. A "URL" is a formatted text string used by browsers, email clients and other software users to identify a network resource on the internet.
"URL" stands for

A Universal Resource locator.

B Unlimited Resource locator.

C Universal Reference link.

D Universal Resource link.

14. Which of these is an example of a computer?

A weather forecasting

B economic modelling

C data logging

D robotics

15. In systems analysis and design, documentation is prepared at which stage?

A every stage

B systems design

C systems analysis

D systems development

16. Controlling access to sensitive electronic information so that only those with legitimate access can do so is known as

A piracy.

B ethics.

C IT security.

D data integrity.

■II

17. Data that cannot be changed without authorisation is an example of

A confidentiality.

B availability.

C integrity.

D ethics.

18. Using the new system at the same time with the old system to compare results is known as

A pilot conversion.

B direct conversion.

C phased conversion.

D parallel conversion.

19. A clear statement of goals and objectives developed at the analysis phase of the project is called the

A project specification.

B documentation.

C flow chart.

D design.

20. During which stage in the systems analysis and design are enhancement, upgrades and bug removal done?

A problem or opportunity identification

B development and documentation

C maintenance and evaluation

D design

21. Which of the following is **not** an SQL aggregate function?

A AVG

B Sum

C MAX

D CURRENT - DATE( )

22. DBMS enable users to create and maintain a database.
DBMS is a collection of

A keys.

B programs.

C translators.

D language activities.

23. A relational database developer refers to a record as

A an attribute.

B a criteria.

C a relation.

D a tuple.

24. The key used to represent relationships between tables is the

A secondary key.

B primary key.

C foreign key.

D local key.

25. The program which is originally written by a programmer is classified as

A an interactive program.

B a machine code.

C a source program.

D an object code.

26. The function which is used in step wise refinement of a program is classified as a

A subroutine format.

B routine format.

C library format.

D procedure.

27. A loop statement which is repeated to a given number of times is a

A GO loop.

B FOR loop.

C REPEAT loop.

D GO REPEAT loop.

28. A sequence of instructions that are carried out for a particular task is called a

A routine.

B function.

C procedure.

D subroutine.

29. Solving a problem by proceeding from the general to the specific is called

A flow charting.

B pseudocoding.

C top-down design.

I) problem definition.

30. The part of an algorithm which is repeated for a fixed number of times is known as

A a sequence.

B a selection.

C an iteration.

D a reverse action.

31. The first step in problem solving is to

A define the problem.

B practice a solution.

C design a solution.

D organise data.

32. Data which is used to test each feature of a program and is carefully selected is classified as

A program output.

B program input.

C test program.

D test data.

33. A risk that could cause loss of software, data, information, or damage to computer hardware or processing capability is called computer

A terrorism.

B network.

C security.

D liability.

34. A password guessing program is called a password

A biometric.

B cracker.

C hask.

D key.

35. A clickable link that takes you from one document to another, or to any resource, even within the same document, with text that is highlighted in some fashion is a

A URL.

B locator.

C protocol.

D hyperlink.

36. Which of the following is **not** a valid image file type?

A .prg

B .rst

C -jpg

D .bmp

37. A system where output affects the next input makes use of

A feedback.

B buffering.

C batch processing.

D multi-programming.

38. Computer business ethics deals primarily with

A moral obligation.

B social responsibility.

C being unfair to the competition.

D the pricing of products and services.

39. Exploration of new markets abroad for technology products and services is an example of

A threats.

B strengths.

C weaknesses.

D opportunities.

40. When data is automatically logged by the computer, the input device is called

A an analogue-digital converter.

B an interactive system.

C an interface.

D a sensor.

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ZIMBABWE SCHOOL EXAMINATION COUNCIL
GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE NOV 2019 4021/1

1	D
2	B
3	B
4	A
5	C
6	B
7	B
8	A
9	B
10	A
11	B
12	B
13	A
14	D
15	A
16	C
17	C
18	D
19	A
20	C

21	D
22	B
23	D
24	C
25	C
26	D
27	B
28	C
29	C
30	C
31	A
32	D
33	D
34	B
35	D
36	A/B
37	A
38	A
39	D
40	D

Candidate Name Centre Number Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER SCIENCE 4021/2

PAPER 2 Structured

NOVEMBER 2019 SESSION 2 hours 30 minutes

Candidates answer on the question paper

No additional materials are required.

Allow candidates 5 minutes to count pages before the examination.

This booklet should not be punched or stapled and pages should not be removed.

Time 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.
Write your centre and candidate number in the box on the top right corner of every page of this paper.

Check that all the pages are in the booklet and ask the invigilator for a replacement if there are duplicate or missing pages.

Answer **all** questions.
Write your answers in the spaces provided on the question paper using **black** or **blue** pens.

INFORMATION FOR CANDIDATES
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 100.

This question paper consists of 13 printed pages and 3 blank pages.

Candidate Name Centre Number Candidate Number

1. Explain the computer terms below. Give an example for each term.

(a) Half duplex transmission

[2]

(b) Online processing

[2]

(c) Bandwidth

[2]

(d) Electronic scabbing

[2]

I. **(e)** Handshaking

.....

.....

.....

.....

[2]

2. **(a)** State any **four** functions of the operating system software.

1. .....

.....

.....

.....

3. .....

.....

4. .....

.....

[4]

(b) Name any **two** devices used for automatic data capture. Give a suitable application for each device.

1 .....

Application .....

2 .....

Application .....

.....[4]

4

2. **(c)** From the list below, choose any **two** that can be used as output devices.

v \ \ \

Candidate Name Centre Number Candidate Number

Plotter DVD Rom Buzzer Keyboard Hard disk Scanner

.....

.....

P]

3. A car manufacturing company has introduced robots to replace human manpower.

(a) Outline any four benefits of introducing robots to the company.

1 **..**

.....

2 .....

.....

3 .....

.....

4 .....

.....

[4]

(b) How could the robots be trained to assemble cars?

.....

..... [2]"

(c) Name any other **three** applications of robots in industry.

1 .....

2 .....

3 .....

..... **[3]**

4. Write an algorithm to add two examination marks, calculate the total and average, then decide if the average is a "pass' or a 'fail'.

Hint: **Pass > 49**
Fail < 50

[6]

5. **(a)** Give any **four** features of Data Protection Act.

1 .....

2 .....

3 .....

4 .....

..... [4]

Candidate Name Centre Number Candidate Number

6

5. (b) Below is a list of typical internet security issues.

hacking pharming phishing spyware viruses

Describe any **three** security issues from the list above and suggest a way to guard against each.

(a)

6. [6]

Explain any difference between

(> **extranet** and **intranet,**

)

[2]

(« **hub** and **bridge.**

[2]

6. **(b)** Explain why a network card is important.

.....

.....

[1]

7. **A** business intends to change from a manual wage system to a computerised system for their employees.

(a) Suggest any **three** factors that triggered the system change.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(b) List any **four** fact finding techniques that can be used during the change.

1 .....

2 .....

3 .....

4 .....

.....[4]

(c) Give any **two** stages in the analysis stage during the change.

1 .....

2 .....

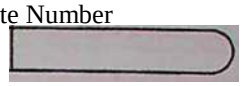
[2]

(d) Write down any **one** form of user training that can be employed during the change.

.....

[1]

Candidate Name Centre Number Candidate Number



'• **(a)** State any **three** features of a web browser.

1 _____

2 .....

3 .....

[3]

(f) Explain the meaning of the term **newsgroup.**

[2]

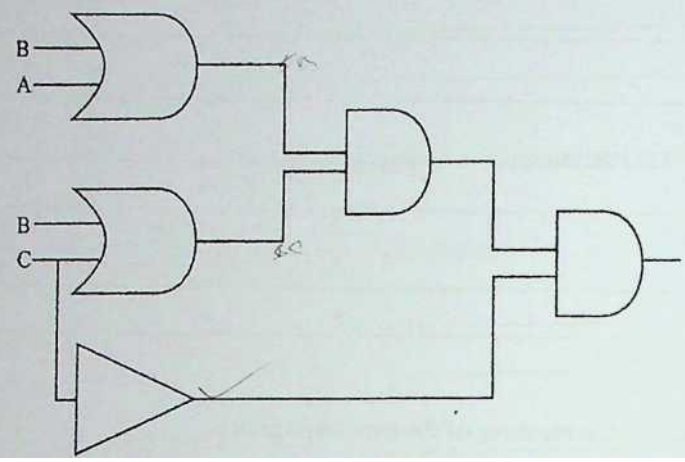
8. (a) Describe any **two** differences between **high level language** and **low level language.**

[4]

(b) State any **one** difference between an **interpreter** and **a compiler.**

[11

9. Below is a logic circuit.



Use the logic circuit to complete the truth table below.

A	B	c	u	\C	i ...	V	
0	0	0	0	0)	\	0	0
0	0	1		i	*0*	u	o
0	1	0	\	i	1	1	
1	0	0	\	0	I	0	
1	0	1	\	f	0	1	
1	1	0	\	(	\	*1*	!
1	1	1	\	1	0	\	o
0	1	1	\	1	0	i	0

[10]

10. The database below is a students' file at a high school.

student number	surname	first name	D.O.B	sex	form	fees paid
5A20	MOYO	BRENDON	12/9/86	M	5	$500
4S10	JAM	CHIPO	15/8/87	F	4	$450
4C30	MUSONZA	JOHN	20/10/85	M	4	$120
4C41	MATEC	JIM	30/6/89	M	4	$100
5S11	CHIODZA	ANTONY	21/3/88	M	5	$210
3C14	BYTE	TATENDA	20/3/85	F	3	$4.90

(a) State the number of records in the students' file.

(b) Identify a key field in the students' file.

[2]

(c) State any **two** features of a database.

[2]

(d) Define the term

(i) database,

[1]

(ii) record,

[1]

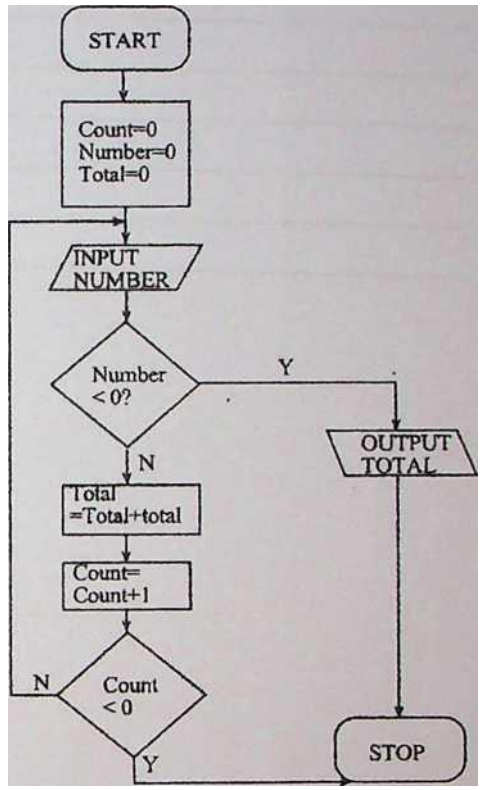
10. (d) (iii) **file.**

[1]

(e) Give any two validation checks that can be used to check D.O.B and form.

[2J

11. Study the program flow chart below.



Use the flow chart to complete the trace table below for the given set of data.

5, 6, 2, 0, - 9

number	total	count	output
0	0	0	
5	5	1	
C			
2			
0			
-			

12. Discuss any **three** ideal conditions for computer based business location.

[6]

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ZIMBABWE SCHOOL EXAMINATION COUNCIL

General Certificate of Education Ordinary Level

EXPECTED ANSWERS

NOVEMBER 2019

COMPUTER SCIENCE **4021/2**

1

(a) **Half duplex transmission** - is a mode of transmission where data is sent in both directions but not at the same time.
Examples: walkic talkie, over-over, police radio

(b) **Online processing** - is whereby the processing is done and is directly connected to the main computer/server.
Example: ATM, POS

(c) **Bandwidth** - is the data carrying capacity of a transmission channel and is measured in bits per second.

«1) **Electronic scabbing** - Is when organizations use their private networks (Intranets) to transfer computer duties e.g. word processing duties, from a branch in one country with striking workers or increased workload to a branch in another country with non-striking workers so that work continues or the workload is reduced.

(e) **Handshaking** - is the exchange of signals between devices so as to establish their readiness to send and receive data (communicate).
Example: communication between printer and computer

2

(a) **Functions of an operating system**

1. Provides a user interface.
2. Control of input and output devices.
3. Handling of interrupts.
4. System security (e.g. handling of passwords).
5. Memory management.
6. File management.
7. Job scheduling.
8. Error reporting and handling.
9. Maintain user accounts.
10. Multitasking.
11. Loading and running software.
12. Utilities and support services (e.g. copy, save, rename etc).
13. Spooling.
14. Batch processing.

(b)

Device	**Application**
Barcode Reader	-Stock control -Library system
Optical Mark reader	-Filling in lottery entry forms. -Marking of multiple choice exams
Data Loggers	-Weather monitoring -Experiments data collection
MICR	-Read bank cheques
Optical Character Reader	-Reading documents
Digital Camera	-Traffic control Security

	(c)		Plotter Buzzer
3	**(a)**		**Advantages of using Robots** Robots can perform tasks faster than humans, thus they are more efficient. Robots can perform tasks more accurately and consistently than humans. Robots can work 24 hours a day with no salary or food. Robots reduce wage bills as fewer work forces will be needed. Robots can perform those tasks that are repetitive and tedious to humans. Robots can be made to perform tasks which are too risk for humans such as removing bombs in landmines, cleaning nuclear reactor plants or even in fire fighting missions. Robots **don't get bored /** hate their job!
	(b)		**1.** Tasks are repeated by skilled workers and each task done is memorised **2.** Tasks arc directly programmed into the robot's microprocessor.
	(c)		**Applications of Robots** Car motor assembly Domestic duties - lawn mowing, swimming pool cleaning Industry -spray painting, welding, lifting heavy metals Used in labs and pharmaceuticals In hospitals to carry out surgical operations Cleaning and maintaining nuclear reactors Removing bombs in land mines Agriculture - sheep shearing and fruit picking Underwater inspection Packaging of manufactured goods Electronics - making circuit boards of electronic gadgets Education - used as virtual tutors to assist students

4

Start

Total — **0**
Average **= 0** *Enter first and second number T otal = First + Second Average = Total divided by 2 If Average* > **49** *then Print "PASS" Else*
If Average < **50** *then Print "FAIL"*
End If
End If
End

5

(a)

Features of the Data Protection Act

- Personal data must be up to date.
- Personal data must be accurate.
- Personal data must be processed fairly and lawfully.
- Personal data must be held securely.
- Personal data must be protected from accidental damage.
- Only authorized users can have access to the data.
- Personal data must be dcleted/dcstroyed when no longer required.
- Personal data can only be used for the purpose for which it was collected.
- Personal data should not be passed to a third part without owner's permission.
- Data users must register what data is used or is stored

(b)

Hacking

Hacking is the gaining of illegal/unauthorised access to a computer system

Protection against Hacking

Use of firewalls
Use of intrusion detection systems
User of passwords and user IDs Biometric Authentication
Data Encryption

(c)

Pharming

Pharming is a method of collecting personal data in which a hacker installs malicious code onto a person's computer or server.
When a user types in a web address, they will be redirected to a fraudulent but legitimate looking website without their consent.

			Protection against pharming Use of up to date antivirus program to detect malicious pharming malware. Ensure you arc using secure web connections (look for https in the website) Be cautious when opening links or attachments that you were not expecting or those from an unfamiliar sender. Avoid suspicious websites **Phishing** Phishing is done by sending a fraudulent e-mail that pretends to be from a bank or reputable source. In the email, you are asked to send personal information such as usernames, passwords or bank details. These are then used for identity theft or fraud. **Protection against phishing** Do not click on any links listed in the email message Do not enter personal information in a pop-up screen Install a phishing filter on your email application and also on your web browser. **Spyware** A spyware is a malicious program that gathers information such as passwords and usernames by monitoring key presses on a user keyboard activity and relays the information to the person who sent the spyware. **Protection against Spyware** Use of intrusion detection systems Use of firewall programs Use of drop down boxes and on screen keyboards Use of up to date antivirus program **Virus** A vims is a computer program that can spread across computers and networks by making copies of itself, and usually causing damage to computer files. **Protection against viruses** Use of an up to date antivirus program Use of firewall Scan e mail attachments Avoid use of pirated software

6	**(a)**	**(i)**	Extranet is a network that give access to users/customers outside the organisation whilst intranet is a private network that can only be accessed by members/users within the organisation.
		(ii)	A bridge is used to link a network while a hub is a device used as a connection point for devices and computers on a LAN. A bridge operates on the Data Link Layer whilst a hub operates on the Physical Layer A bridge is intelligent whilst a hub is dumb
	(b)		A network card allows the computer to be connected to the internet. The NIC provides the physical interface between the computer and the cabling. It prepares data, sends data and controls the control and flow of data. It can also receive and translate data into bytes for the CPU to understand.
7	**(a)**		**Factors that can trigger development of new system** New government policies New technology on the market Competition on the market Current system needs modification - Need for increased efficiency To reduce wage bill
	(b)		**Fact finding Techniques** Interviews Observations Questionnaire Record inspection Automatic data logging Research
	(c)		**Analysis Stage** Description of existing solution Evaluation of existing solution Consideration of alternative solutions Fact finding Requirements gathering
	(d)		**User training methods** Classroom training Computer based training On the job training
	(e)		**Features of a browser** Listbox Graphics

- Videos
- Templates
- Buttons - refresh button, home button
- Bookmarks
- Navigation arrows
- Address bar

(0 A newsgroup is a global connection of electronic bulletin board system in which users exchange information on different topics.

8 (a) **Differences between High level and low level languages**

High Level Language	**Low Level Language**
Problem oriented	Machine oriented
Needs an interpreter/compiler	No need for interpreter or compiler
Portable	Not portable
Consists of English like statements	Consists of zeros and ones
Easy to write	Difficult to write
Occupies more memory	Occupies less memory
Not secured	secured

(b) **Differences between compiler and interpreter**

Compiler	**Interpreter**
Translates whole program at once	Translates program statement by statement
Translates before execution	Translate during execution
Produces object code	No object code produced
List error after translation	Indicate errors during translation
Difficult to debug	Easy to debug,
Object code used without the source code and is portable	Needs source code to be executed
Requires more memory	Requires less memory

9

Truth Table

A	B	C	A+B	B+C	C'	(A+B)(B+C)	C' (A+B)(B+C)
0	0	0	0	0	1	0	0
0	0	1	0	1	0	0	0
0	1	0	1	1	1	1	1
1	0	0	1	0	1	0	0
1	0	1	1	1	0	1	0
1	1	0	1	1	1	1	1
1	1	1	1	1	0	1	0
0	1	1	1	1	0	1	0

■

10

(a) 6 (six)

(b) Student Number

(c) **Features of a database**

- Can search for specific fields
- Can sort data in predetermined order
- Can export data to other related packages
- Can add/dcletc records and fields
- Can merge two or more database
- Can perform calculations on numeric fields

(d) Database - is a collection of related data designed to meet the needs of an organisation.

(i) Record - a collection of related fields

(ii) File - a collection of related records

(e) **(iii)**

DOB

- Format check
- Range check
- Character check
- Length check
- Presence check

FORM

- Format check
- Range check
- Character check
- Length check
- Presence check

11 **(a)**

NUMBER	TOTAL	COUNT	OUTPUT
0	0	0	
5	5	1	
6	11	2	
2	13	3	
0		4	
-9			13

12

Ideal Condition for Business location

Funding
Clicnts/markct
Transport network Communication facilities Raw materials infrastructure

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER SCIENCE 4021/1

PAPER 1 Multiple Choice

NOVEMBER 2020 SESSION 1 hour

Additional materials:

Multiple Choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C** and **D.** Choose the **one** you consider correct and record your choice in soft **pencil** on the separate answer sheet provided.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score **one** mark. A mark will **not** be deducted for a wrong answer.
Any rough working should be done in this booklet.

This question paper consists of 13 printed pages and 3 blank pages.

Answer all questions.

1 The part of a computer where programs are run is called the

A RAM.

B ROM.

C processor.

D mother board.

2 An operating system lets the user group files together for convenience. Such a group is called a

A block.

B sector.

C folder.

D cluster.

3 Which of the following is **not** a hardware component?

A processor

B hard disk controller

C network interface card

D payroll processing system

4 In a database about school learners, one field records whether a learner has had a TB vaccination. The most efficient data type to store this fact will be

A text.

B memo.

C number.

D boolean.

5 Which of the following is **not** a feature of business?

A exchange of goods and services on a regular basis

B dealing in goods and services

C risk and uncertainties

D work for others

6 During which stage are system flow charts usually drawn ?

A implementation

B evaluation

C analysis

D design

7 Which of these is likely to take place during the investigation stage of systems development?

A design of data input screens

B examination of paper work

C training of staff

D writing code

8 A marketing philosophy summarised by the phrase 'a stronger focus on social and ethical concerns in marketing' is characteristic of which period?

A sales

B marketing

C production

D societal marketing

9 The Data Protection Act covers data which is stored

A on computer systems and paper systems.

B for accounting purposes only.

C on computer systems only.

D on paper systems only.

10 Which of these methods is most likely to reduce the chances of a virus problem in a computer network?

A preventing the access of emails

B installing anti-virus software

C backing up data regularly

D installation of a firewall

11 Which of these types of network cable is **not** affected by interference from other cables?

A UTP

B Co-axial

C fibre-optic

D thin ethemet

12 What name is given to a work station on a network?

A a terminator

B a terminal

C a server

D a hub

13 Some of the characteristics of good programming are

A simplicity, natural, efficient, and compactness.

B hard to understand, lengthy and incompact.

C complex, English-like and non-modular.

D unstructured, inefficient and complex.

14 Which one is **not** true about indentation?

A It can be staggered while writing a program.

B It makes programs simpler to understand.

C It is compulsory while writing a program.

D It makes programs more readable.

15 When a new system is installed for only a small number of users to test and evaluate, this is called

A parallel running.

B pilot running.

C all at once.

D module.

16 Hacking is an attempt to

A access files without authorisation.

B infect files with a virus.

C damage data.

D alter data.

17 A mobile telephone that is able to access internet pages, uses which type of protocols?

A FTP

B IPX

C SMP

D WAP

18 Video conferencing is often of poor quality when internet connectivity is used.
The most likely reason for this is

A the operating system of some personal computers is incompatible with video conferencing.

B many users do not have broadband connections.

C web cameras do not have enough pixel density.

D the internet cannot send moving pictures.

19 Why is it wrong to use a text data type to store money values?

A The pound or dollar sign cannot be displayed.

B The decimal point cannot be displayed.

C Calculations cannot be performed.

D The data cannot be sorted.

20 A small computer is used in a car to show how far the driver can expect to go before needing to refuel.
This computer system is called

A interactive.

B a simulation.

C process control.

D embedded system.

21 The device used to input data into a burglar alarm system is the

A light pen.

B scanner.

C reader.

D sensor

22 Which of these instructions embedded in a web page, would cause the text following it to be displayed in the largest letters?

A <HI>

B <H6>

C <HEAD>

D <TITLE>

23 'IF... Then ... Else' structures are called

A selection logic structures.

B sequence logic structures.

C iteration logic structures.

D program logic structures.

24 An algorithm can be described by using a series of program-like statements, but without writing the program.
This is called the

A high level code.

B low level code.

C object code.

D pseudocode.

25 What shape represents a process in a flow chart?

A a cylinder

B a diamond

C a rectangle

D a parallelogram

26 A small program designed to run in a web page is called

A a hyperlink.

B an anchor.

C an applet.

D a frame.

27 Deciding where the data will come from in a project is looked at during the

A implementation stage.

B analysis stage.

C problem identification stage.

D design stage.

28 What is —6 in one's complement?

A 001

B 111

C 010

D 101

29 2Oio to base 2 is

A 00100

B 10100

C 11000

D 10101

30 Given

$IOOO_2 + IOOO_2$

the correct answer is

A 1 00001

B 1 0000

c 1 0001

D 0001

31 A biologist uses a computer to model the growth of an insect population.

What is the main advantage of using computer modelling in this case?

A More generations can be tested in a limited time.

B There are very few variables to take into account.

C The results are likely to be very accurate.

D The results will always be the same.

32 **A** computer game allows the player to simulate driving cars around city streets.
Which of these is an input into the system?

A movement of a paddle on the console

B the detection of a crash

C arrival at a cross-road

D the car engine sound

33 Convert $78i_0$ to octal.

A 117

B 116

C 115

D 114

34 Which of the following type of errors cannot be detected by a compiler?

A semantic errors.

B run time errors.

C logical errors.

D syntax errors.

35 Variable declarations are made in which section of a program?

A end-of-job routine

B housekeeping

C file opening

D main loop

36 In 'do ... while loop[1], the loop condition is checked at the

A start of program.

B end of program.

C start of loop.

D end of loop.

Use the following information to answer question 37 and question 38.

An electrical store needs to keep data of its products in a relational database. One of the tables is called STOCK. Its structure is as shown below.

field name	**field type**	**field size**	**example**
Stock nunmber	Number	4 bytes	34 s
Item name	text	15 bytes	Breadmaker
Supplier-code	Text	6 bytes	AB786
Selling price	Currency	8 bytes	120.00
Number In Stock	Number	4 bytes	20
Date last ordered	Date	8 bytes	12/02/03

37 The store currently has 500 products in stock.
The minimum file size required to store all the necessary data is

A 21.972 bytes

B 43.9 bytes

C 21 972 kB

D 43.9 kB

38 Which field will be suitable for a key field?

A Number In Stock

B Supplier_code

C Stock_Number

D Item_Name

39 The section of the CPU that selects, interprets and deals with the execution of program instruction is called the

A arithmetic logic unit.

B memory unit.

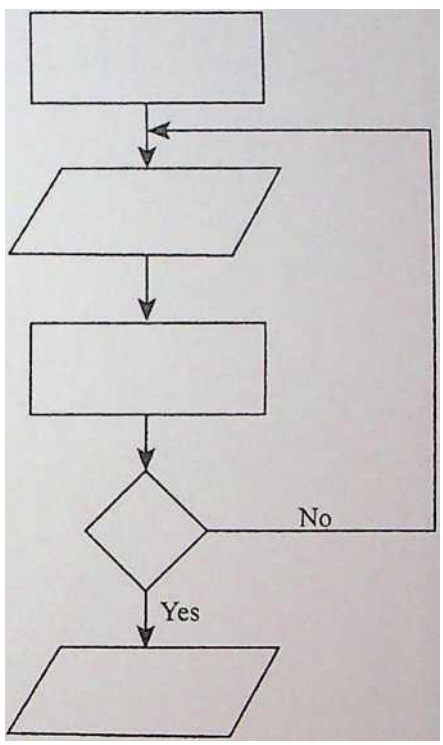
C register unit.

D control unit.

40 A car park has a sensor that detects each car as it enters through the barrier. A computer controls the barrier. The computer software uses an algorithm to operate this function. The algorithm contains the following statements.

1. is counter = maximum?
2. set counter to 0
3. car detected
4. close barrier
5. add 1 to counter

The flow chart below represents the algorithm.



Which group of statements is the correct sequence of the flow chart diagram given?

A 3, 2, 1,4, 5

B 2,3, 5, 1,4

C 1,2, 3,4, 5

D 5, 4,3,2, 1

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ZIMBABWE SCHOOL EXAMINATION COUNCIL

GENERAL CERTIFICATE OF ORDINARY LEVEL

EXPECTED ANSWERS

COMPUTER SCIENCE NOV 2020 | 4021/1

1	**C**
2	**C**
3	**D**
4	**D**
5	**D**
6	**D**
7	**B**
8	**D**
9	**A**
10	**B**
11	**C**
12	**A**
13	**A**
14	**C**
15	**B**
16	**A**
17	**A**
18	**B**
19	**C**
20	**D**

21	**D**
22	**B**
23	**A**
24	**D**
25	**C**
26	**C**
27	**D**
28	**A**
29	**B**
30	**B**
31	**A**
32	**A**
33	**B**
34	**C**
35	**C**
36	**D**
37	**A**
38	**C**
39	**D**
40	**B**

Candidate Name Centre Number Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMPUTER SCIENCE 4021/2

PAPER 2 Structured

NOVEMBER 2020 SESSION 2 hours 30 minutes

Candidates answer on the question paper

No additional materials are required.
Calculators must not be used in the examination.

Allow candidates 5 minutes to count pages before the examination.

This booklet should not be punched or stapled and pages should not be removed.

Time 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.
Write your centre and candidate number in the box on the top right corner of every page of this paper.

Check that all the pages are in the booklet and ask the invigilator for a replacement if there are duplicate or missing pages.

Answer **all** questions.
Write your answers in the spaces provided on the question paper using **black** or **blue** pens.

INFORMATION FOR CANDIDATES
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 100.

This question paper consists of 10 printed pages and 2 blank pages.

Centre Number Candidate Number

For Examiner's Use

Answer all questions.

Draw and label a block diagram of a computer system, showing the **five** basic hardware components of 3 computer.

[10]

For Examiner's Use

(a) A real time stock control system is used in a supermarket. Describe what happens when an item is purchased.

[6]

(b) State **any four** advantages of using point of sale terminals in transactions.

1

2

3

4

[4]

(c) Draw and label any network topology.

PI

[Turn over

For Examiner's Use

3 **(a)** Explain the term **protocol.**

[2]

(b) Name any **one** computer networking model besides the Open System Interconnection (OSI) model, that exists.

(c) State any **four** levels of the OSI model, in their order.

I

2

3

4

[4]

(d) Define the term **network topology.**

HI

(e) Differentiate the following terms.

simplex and duplex transmission mode

For Examiner's Use

(c) email and ordinary mail

Define the term data protection legislation.

[4]

(a)

[2]

(b) Write down any five points under the Data Protection Act.

1

2

3

4

5

[5]

List any **three** ways that data can be accidentally lost.

1

2

3

[3]

For Examiner' Use

5 (a) Define the term **algorithm.**

_____

_____

[2]

(b) Draw and name the stages in systems development life cycle.

[7]

(c) State any **three** tools that are used in the design stage of the systems development life cycle.

1 ____

2 _____ ____

_____

[3]

For Examiner's Use

6 Write an algorithm that inputs a set of numbers and outputs the number of positive numbers and the number of negative numbers.

[8]

7 **(a)** Write down the **three** types of programming constructs.

1 _____

2 _____

3 _____

[3]

(b) Using a diagram, illustrate any **one** type of programming construct.

[21

Candidate Name Centre Number Candidate Number

For Examiner's Use

8 **(a)** Write a statement to display a title when designing a web.

[3]

(b) Define

(i) a tag;

[1]

(ii) an element.

[1]

9 **(a)** Convert the following binary numbers to octal.

(i) 1010010

Answer

[2]

(ii) 10010001

Answer [2]

For Examiner's Use

(iii) 111011001

Answer _____

[2]

(b) Convert the following hexadecimal numbers to denary.

(i) AF5

Answer _____

[2]

(ii) 67B

Answer _____

[2]

10 Write SQL commands to select data from the table and delete a row.

[5]

For Examiner's Use

11 **(a)** Explain the meaning of **Database Management System (DBMS).**

[2]

(b) State any three functions of a Database Management System.

1

2

3

[3]

12 **(a)** Identify any **two** factors that affect marketing strategy.

1

2

[2]

(b) State any **three** elements of intellectual property.

1

2

3

[3]

For Examiner's Use

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ZIMBABWE SCHOOL EXAMINATION COUNCIL

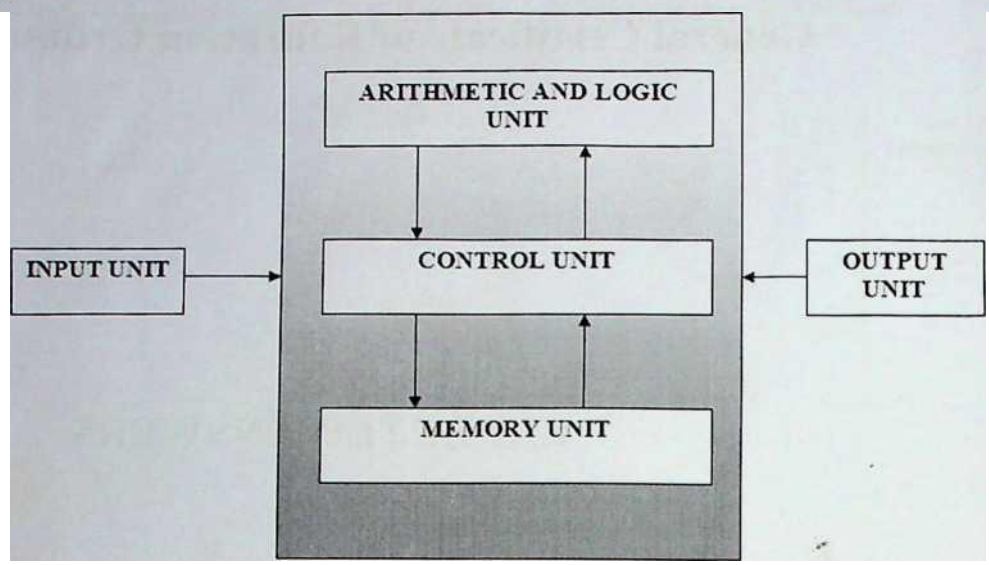
General Certificate of Education Ordinary Level

EXPECTED ANSWERS

NOVEMBER 2020

COMPUTER SCIENCE 4021/2

1



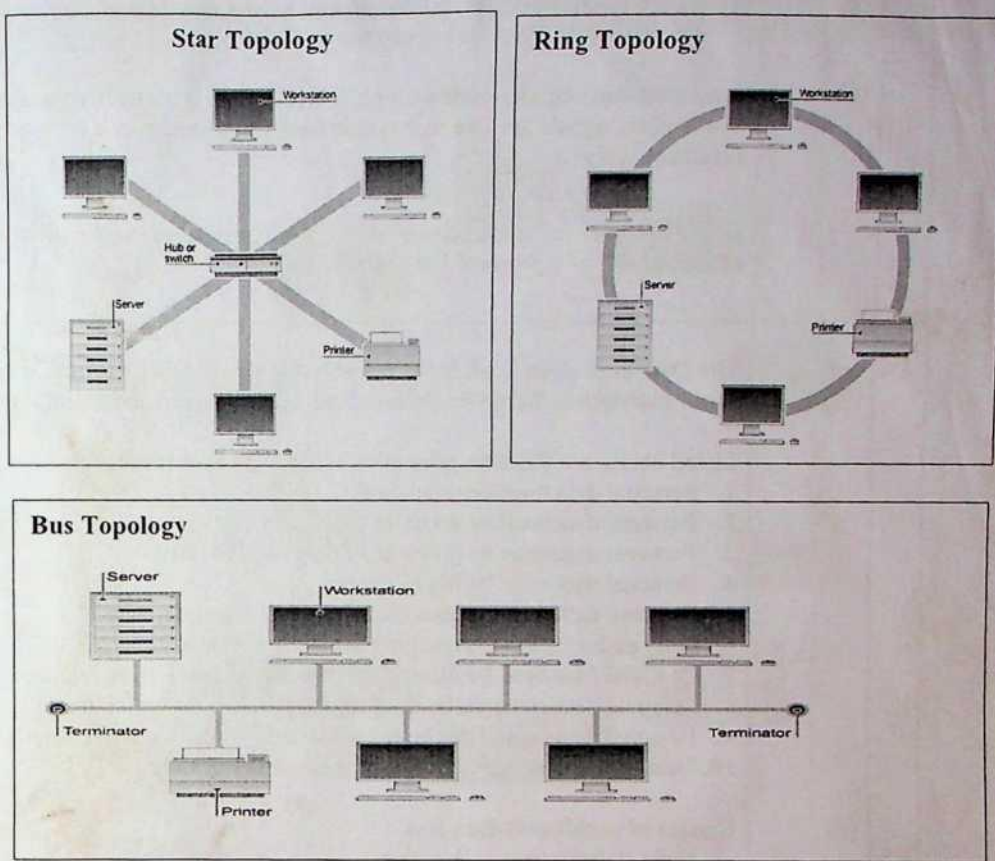
2 (a)

1. The product barcode is scanned and information particularly the product code is sent to the system.
2. The stock file is searched for a product which matches the scanned barcode number/product ID.
3. The number in stock of the product is read and number of items purchased is subtracted from the number in stock.
4. The number in stock is compared with the re-order number. If it is equal to/less than the re-order number, then more goods are automatically re-ordered.
5. The new value of number in stock is written back to the file whilst an itemized receipt is printed for the customer.

(b)

Advantages of using point of sale terminals

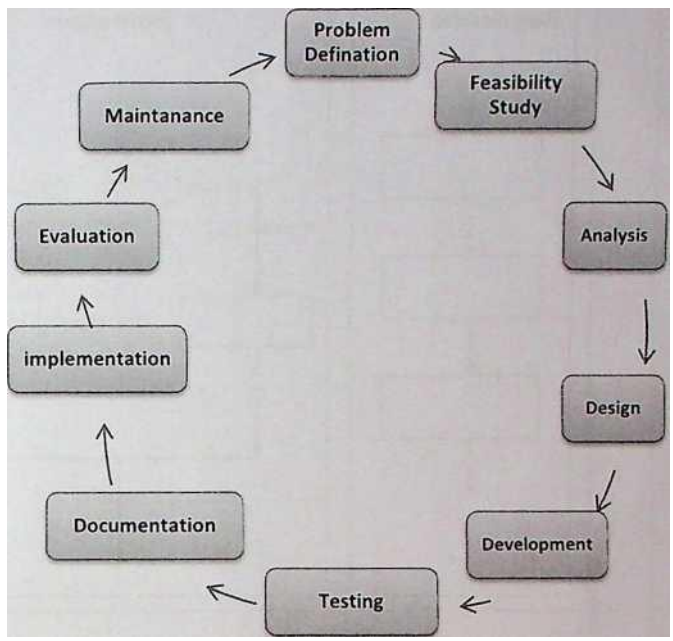
Business transactions carried out faster through use of computerized system.
Business can operate with less staff, thus reduced wage bill.
Fewer errors encountered during data processing, accurate calculations done.
Less stationary needed serve for that used in printing receipts.
Easier to check price for a particular product.
Automatic re-ordering of stock.
Shopping trends more easily identified - less selling products put on sale.
Readily available sales reports/statistics useful for management.
Automatic updating of stock file.
- Itemized receipts produced for the customer.
Reduced cheating by staff since every transaction is recorded.
The system can record staff working rates
Systems links to EFTPOS thus customers can buy using credit/bank cards.

	(c)		
3	(a)		- A network protocol is a set of rules used to determine how devices within a network communicate and interact with each other. - Protocols ensure that data is transferred from one client computer to another without errors. - Some common examples of transfer protocol include **TCP/IP, HTTP, FTP** and **TELNET**.
	(b)		Transmission Control Protocol/Internet Protocol (TCP/IP)
	(c)		**1.** Application Layer **2.** Presentation Layer **3.** Session Layer **4.** Transport Layer **5.** Network Layer **6.** Data Link Layer **7.** Physical Layer

	(d)		A network topology is a layout/arrangement of computers in a network.
	(e)		A simplex transmission mode is one in which data is transferred only in one direction whilst in a duplex, signals arc free to travel in both directions over a transmission medium simultaneously. e-mail involves the transmission of electronic messages via the internet whilst ordinary mail is the transfer of a physical letter (mail) via post.
4	**(a)**		The Data Protection Legislation is a set of legal guidelines for the way that personal data about individuals should be obtained, processed, stored and maintained.
	(b)		Listed below are the main principles of the Data Protection Act. **1.** Personal data must be up to date. **2.** Personal data must be accurate. **3.** Personal data must be processed fairly and lawfully. **4.** Personal data must be held securely. **5.** Personal data must be protected from accidental damage. **6.** Only authorized users can have access to the data. **7.** Personal data must be dclctcd/destroyed when no longer required. **8.** Personal data can only be used for the purpose for which it was collected. **9.** Personal data should not be passed to a third pan without owner's permission. **10.** Data users must register what data is used or is stored.
	(c)		**Causes of accidental data loss** Natural disasters e.g. fire, floods Power outages Viral attacks Hackers and dishonest insiders Hardware failure e.g. hard disk crash Theft of equipment e.g. computer - Accidental deletion by users due to human error Software failure Liquid damage e.g. spill overs of coffee, drink or water on your laptop Accidental hard drive formatting

(a) An algorithm is a sequence of steps designed to perform a particular task.
An algorithm specifies the actions to be executed and the order in which these actions are to be executed.

(b)



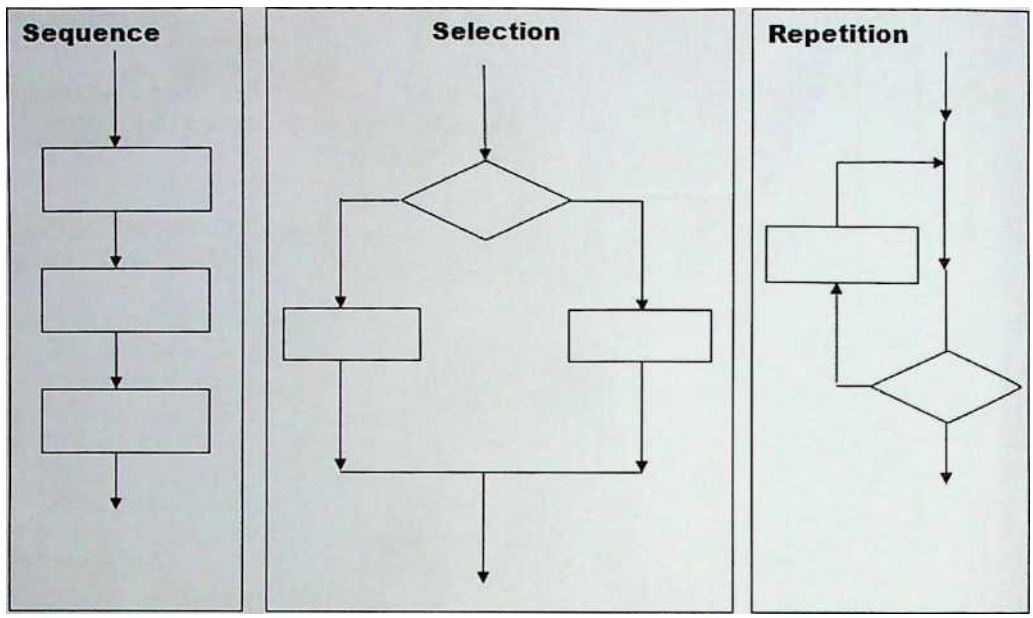
(c)
Microsoft Visio
Microsoft Word
Corel Draw

```
Start
        Negative - 0, positive = 0
                For x ~ 0 to MaxNumber
                Input number
                If number < 0 then negative — negative + 1
                        If number > 0 then positive = positive + 1
                Endif
                Endif
        Next
        Print negative, positive
```

7 (a)

1. Sequence
2. Selection
3. Repetition/lteration

(b)



(a)

```
<head>
    <title>This is my Title</title>
</head>
```

(b) (i) Tag - is a keyword which defines how the web browser will format and display the web content.

(») Element - is an individual component of an HTML document for example the title element represents the title of the document

9	**(a)**	**(i)**	122_8
		(ii)	221_8
		(iii)	731_8
	(b)	**(i)**	$2\,805_{10}$
		(ii)	$1\,659_{10}$
10	**(a)**		SELECT column1, column2,……..columnN FROM table_tame;
	(b)		DELETE FROM table_name WHERE [Condition]

11	**(a)**		A DBMS is a software system that allows users to define, create and maintain a database as well as providing controlled access to the data.
	(b)		**Functions of a DBMS** It enables users to access the database. It enables users to update the database. It allows users to retrieve data from the database (i.e. querying and reporting). It ensures data independence. It ensures data integrity and consistency. Enforces security - ensuring that only authorised users can access the database. Multi-user access control - a DBMS enables multiple users to access the database simultaneously without affecting the integrity of the database. Backup and recovery management Transaction management - the DBMS makes sure that all the updates in a given transaction are made or not made. A DBMS monitors database usage and operation. A DBMS removes deleted records from the database (Garbage Collection). A DBMS offers facilities to import the database from flat files. Allocation of storage space for data in the database. A DBMS offers a user accessible data dictionary which contains description of the data in the database.
12			**Factors affecting marketing strategy** Social factors e.g. religion, family, buying potential of target market Economic factors e.g. income levels, inflation, interest rates, exchange rates Laws and regulations of the country Technological innovation Environmental factors . Company objectives Business culture.