Marking Scheme KCSE 2016

COMPUTER STUDIES
PAPERS 1

No.1.(a) State the meaning of the term disk defragmentation as used in computers. (1 mark)
- ❖ The process of rewriting parts of a file to contiguous sectors on a disk.

(b)State the purpose of disk defragmentation. (1 mark)
- ❖ to increase the speed of access and retrieval of files.
- ❖ to increase space on the disk space

No.2. Identify the appropriate computer output device suitable for each of the following tasks:

(a) generating receipts where carbon copies are required; (1 mark)
- ❖ Carboncopies - impact printers e.g. dot matrix.

(b)an architectural drawing where precision is required; (1 mark)
- ❖ Architectural design - plotter

(c) producing document output for a visually impaired person. (1 mark)
- ❖ Visual impairment - speakers/brailles

No.3.Pesa Tele Company has offices in Nairobi and Kampala connected in a network. The management is convinced that someone is illegally gaining access to the data in their computers. State three ways in which the company can overcome this problem. (3 marks)
- ❖ Encryption.
- ❖ Firewalls.
- ❖ User profiles/passwords/user.
- ❖ Limit the number of log-in attempts.
- ❖ Audit trail/tracking.
- ❖ Physical protection of computers.

No.4.Explain two ways in which the use of Internet could make reporting of corruption easier.(4 marks)
Interactiveness:
- ❖ the internet based technology enables real-time dialogue hence instantaneous reporting of cases;

Outreach:
- ❖ the technology allows the coverage of wide areas/can be reported from anywhere;

Social mobilisation:
- ❖ It is easy to use technology to create a network with people or organisations with similar concerns;

Anonymity:
- ❖ With use of the technology, it has become easy to report corruption cases without being known;

Security:
The message sent reaches the destination with less risk of being intruded

No.5. State two ways in which software errors can be prevented in program development.   (2 marks)
   ❖ Use of anti-virus software.
   ❖ Update system frequently.
   ❖ Purchase software from authentic sources.
   ❖ Test the software before implementation.
   ❖ Test syntax/logic.
   ❖ Proper training.
   ❖ Proper enactment of laws.

No.6. Convert each of the following binary numbers to decimal equivalent given that the left most digit is a sign bit:
   (a) 00101101

$$1 \times 2^5 = 32 \qquad \tfrac{1}{2}$$
$$1 \times 2^3 = 8 \qquad \tfrac{1}{2}$$
$$\left. \begin{aligned} 1 \times 2^2 &= 4 \\ 1 \times 2^0 &= \underline{1} \end{aligned} \right\} \quad \begin{aligned} \tfrac{1}{2} \\ \tfrac{1}{2} \end{aligned}$$
$$\underline{45}_{10}$$

   (b) 11001001

$$1 \times 2^6 = 64 \qquad \tfrac{1}{2}$$
$$1 \times 2^3 = 8 \qquad \tfrac{1}{2}$$
$$1 \times 2^0 = \underline{1} \qquad \tfrac{1}{2}$$
$$\underline{-73}_{10} \qquad \tfrac{1}{2}$$

No.7. State the functions of each of the following keys on the computer keyboard: (2 marks)
   (a) backspace;
   ❖ moves the display cursor one position backwards, deletes the character at that position, and shifts back the text after that position by one position
   (b) insert (ins)
   ❖ When insert is selected, keys add characters to the screen at the cursor (insertion point) without deleting those already there. When typeover is selected the new characters type over the old, deleting them as they go

No.8. An organisation intends to replace an existing system by carrying out the process in stages.
   (a)   Name this implementation strategy;   (1 mark)
   ❖ The implementation strategy is: - phased change-over/modular

   (b) Give two reasons why the organisation is opting to use the implementation strategy in (a) above.   (2 marks)
   ❖ It gives employees opportunity to learn
   ❖ Organization can revert to old system in case of failure.
   ❖ Reduces resistance by employees.

(c) A manager wishes to replace the current manual system with a computerised one. Describe three main areas that must be evaluated to justify the replacement. (6 marks)

Technical feasibility:
- ❖ Does' the current technology (hardware & software) allow.

Economic feasibility:
- ❖ Are funds available?

Social feasibility:
- ❖ How will the new system impact on the organization/society?

No.9.Headache, back and neck pain may result from the use of computers. State how each of them can be minimised. (2 marks)

Headache
- ❖ Use of filters/antiglare.
- ❖ Proper lighting.
- ❖ Regular break.

Back & Neck Pain
- ❖ Proper/correct furniture for the computer.
- ❖ Correct position of the screen.
- ❖ Correct sitting posture.
- ❖ Taking a break.

No.10. Students of a school intend to elect their school captain by secret ballot. State three ways in which computers can be used to improve the election process. (3.marks)
- ❖ Registering voters/(faster);
- ❖ Voter identification (accurate);
- ❖ Actual voting;
- ❖ Tallying process (speedy).

No.11. Explain why an intranet is a more secure way to share files within an organisation compared to the Internet. (2 marks)
- ❖ Intranet involves interconnection of computers within an organisation, in intranet it's easier to monitor the access and sharing of files since the users working in the organisation can be assigned accounts and passwords which will enable them access the files they are authorised to access unlike the internet where many people can access whatever is stored in the organisation website.

No.12. List two career opportunities directly associated with computer networking. (2 marks)
- ❖ Network administrators
- ❖ Network engineers
- ❖ Network technicians

No.13. Distinguish between a formula and a function as used in spreadsheets. (2 marks)

❖ A **formula** is a mathematical expression that creates a relationship between cells to return a new value while a **function** is an inbuilt predefined formula that the user can quickly use instead of having to create a new one every time they want to do a calculation

No.14. The C directory of a computer has folders named Form 1, Form 2, Form 3 and Form 4. Each class has students' folders named according to their admission number. The students created their own folder for subjects they are studying based on the table shown below:

Form 1	Form 2	Form 3	Form 4
OS	SP	Prog.	ADB
WP	DTP DB	Internet	

(a) A form four student intends to create a folder named proj to store project documents.
State the path for the project folder.   (1 mark)

❖ C:\FORM4\STUDNO\ADB\PROJECT

(b) Suggest how the student can ensure that:
 (i) work is not lost in case the hard disk fails; (1 mark)
❖ Keep backup copies of the project on offline secondary storage media.

 (ii) the project is not copied by other students. (1 mark)
❖ Use passwords for opening and modifying the project

No.15. A water company sends out clerks to read meters. The data collected by the clerks is then fed into the computer and then all bills are printed at the same time.
 **(a) State two advantages of this approach; (2 marks)**
❖ Shifts time of processing to when computers are less busy.
❖ No user input required hence no idle computer time as it awaits input.
❖ Input is done once (batch).
❖ Can enable use of hired equipment hence cost effective.

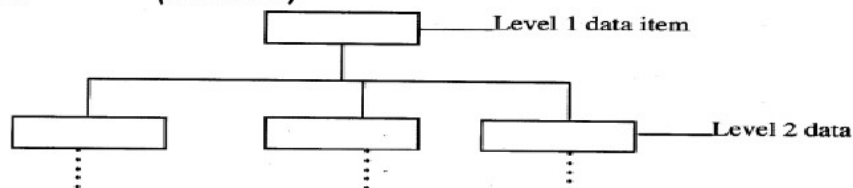 **(b) Name this type of data processing.(1 mark)**
❖ Batch processing.
❖ Electronic

No.16. Figure 1 shows a flowchart. Use it to answer the questions that follow.

Figure 1
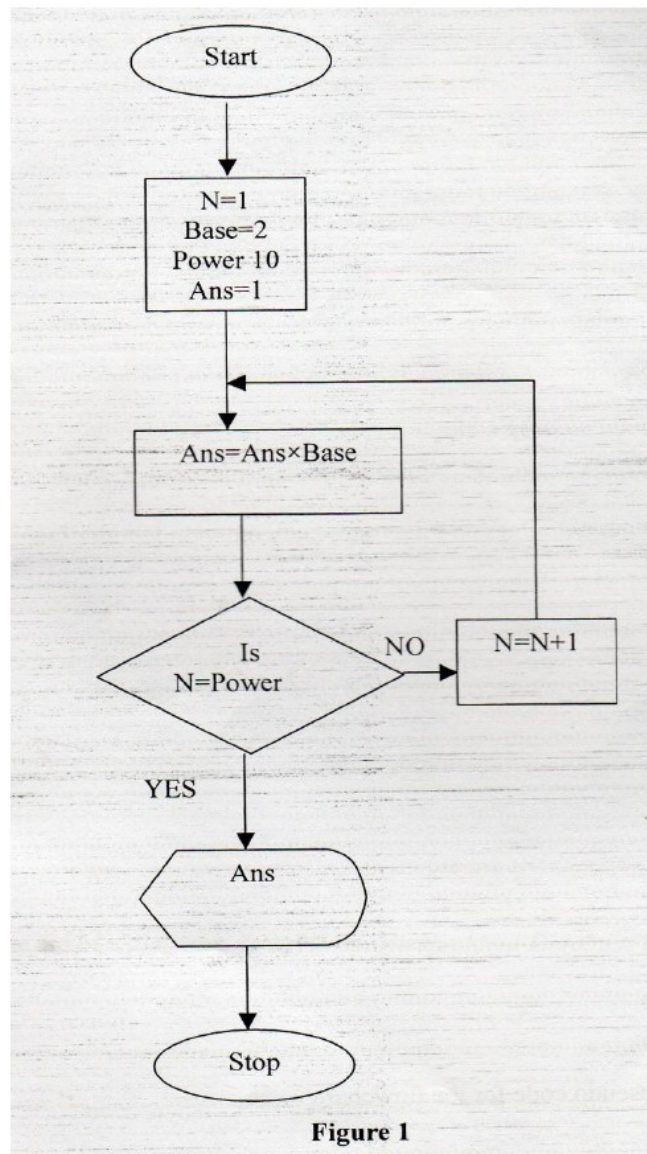
(a) Interpret the flowchart.   (9 mark

(b) Write a pseudo code for the flowchart.   (6 marks)

No.17.(a)With the aid of a diagram, describe the Hierarchical Database Model.   (4 marks)

❖ Data items are arranged in a tree like format.
❖ Access is through a single path and all from one single item called the root component

(b) List three factors that should be considered when developing a database application and give reasons why each should be considered. (6 marks)

Factors
- ❖ Complexity of data/user needs/user friendliness
- ❖ Security and integrity
- ❖ Complexity of DBMS
- ❖ Volume of data/size
- ❖ Software compatibility with existing DBMS
- ❖ Cost of the data base

Reasons
- ❖ Complexity of data - Complex data requires complex DBMS.
- ❖ Security and integrity - Data which is intended to be secured in terms of access, can be handled by complex DBMS which provides for such requirements.
- ❖ Complexity of DBMS - Complex DBMS do require complex skills, hence more training. It is therefore costly to run/use such system.
- ❖ Volume of data - Voluminous data require to be ran on stable application. They also take up extra computer system resources.
- ❖ Software compatibility - enables pre-existing databases to be exported to the new one.

(c) (i) Name three types of validation checks during data entry in data processing.(3 marks)
- ❖ Field type/data type
- ❖ Field size
- ❖ Format
- ❖ Reasonableness
- ❖ Range constraint
- ❖ Presence check

(ii) Differentiate between primary key and index key as used in databases. (2 mark
- ❖ Any **index key** is a database feature used to speed up search and sort operations in a table; whereas
- ❖ **A primary key** is a field that enforces uniqueness in a table so that one record is not entered twice or a **primary** key is a field that uniquely identifies each record.

No.18.(a) Explain two health issues that could arise from the use of unsuitable computer desk. (4 marks)
- ❖ It could lead to back problems if the desk is of an unrealistic height.
- ❖ If it does not provide good positioning of the monitor, it could result in eye strain.
- ❖ Wrist problems will arise if the keyboard and mouse seating positions are bad.
- ❖ Injury as a result of falling computer components due to weak computer desks/ small size.

No.18 (b i)Describe two ways in which a positive number and a negative number can be represented in a computer (2 marks)

- ❖ *In binary one bit usually the most significant or leading bit is used to indicate either positive or negative,and store the unsigned binary representation of the magnitude in the remaining bits.*
- ❖ *Signed magnitude.*
- ❖ *Using the twos complement.*
- ❖ *Using the ones complement.*

(ii) A particular computer stores numbers in a single 8-bit word. Determine how the number 0.3125_{10} would be represented. (3 marks)

$$\begin{array}{ll}
0.315 & \\
\underline{\times\ 2} & \\
6250 & -\qquad 0 \\
\underline{\times\ 2} & \\
1.2500 & -\qquad 1 \\
\underline{\times\ 2} & \\
0.5000 & -\qquad 0 \\
\underline{\times\ 2} & \\
1.0000 & -\qquad 1
\end{array}$$

$$\Rightarrow 0.0101$$
$$\Rightarrow 0000.0101$$

No.19.(a) Figure 2 shows a block diagram of a computer system and its peripheral devices. Use it and answer the questions that follow.

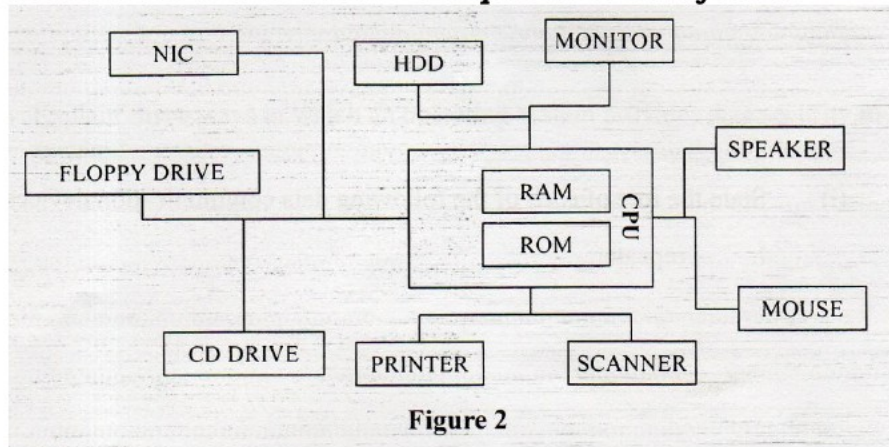**Figure 2**

(i)Name two devices that may be used for storing data for a long duration. (2 marks)

- ❖ *2GB HDD*
- ❖ *32 MB Rom*

(ii) Name three peripheral devices that are used for input.(3 marks)

- ❖ *Mouse*
- ❖ *Scanner*
- ❖ *CD drive*

(iii)Name two other devices that a Computer Aided Design (CAD) user might wish to add to the set up above in order to perform his tasks effectively.   (2 marks)
- ❖ *Digitizer*
- ❖ *Keyboard*
- ❖ *USB port*

19 (b) A customer wishes to purchase a computer system. The customer can buy word processor, spreadsheet, database, and a drawing package separately or as an integrated package. State three reasons why the customer would prefer an integrated package to separate packages(3mks)
- ❖ *The software provides easy movement of data among the separate applications,*
- ❖ *A common group of commands is used for all the applications in the software package,*
- ❖ *Provides easy switching between functions without having to go back to the operating system and ability to share data between functions.*

No.20.(a)Explain three ways in which an operating system provides data security in a computer system (6 marks)
Access control:
- ❖ *Deals with the problem of verifying / authenticating the identity of a user before permitting access to the request resource (e.g. use of passwords, user account);*

Encryption
- ❖ *Transforming data into an unreadable format so that they are safely transmitted;*

Firewalls
- ❖ *Filters out unwanted data and programs/criminals/hackers/malicoius persons;*

Log files
- ❖ *A means by which transactions in a computer system can be recorded thereby detering potential infiltrators;*

Alerts
- ❖ *Alerting a user when he/she is about to delete a file/folder.*

20.(b)State two instances where observation is not a viable method of gathering data during system analysis stage.   (2 marks)
- ❖ *When the analyst wants to collect confidential information,*
- ❖ *When there is a large group of people involved in the system,*
- ❖ *Where the people you want to gather information from are vastly dispersed*

(c) (i) State the role of each of the following data communication devices:
   I. repeater (1 mark)
- ❖ *A device used to re-construct data signal during data transmission to its original strength/amplify/boost/regenerate.*

   II. router. (1 mark)
- ❖ *It is a device used to facilitate movement of data or packets between two or more LANS of different configuration (expansion of networks).*
- ❖ *Delivers a packet/data directly to destination computers.*
- ❖ *Interconnects different networks/provides network services.*

(ii)   ***The figure below shows a network based on the bus topology.***
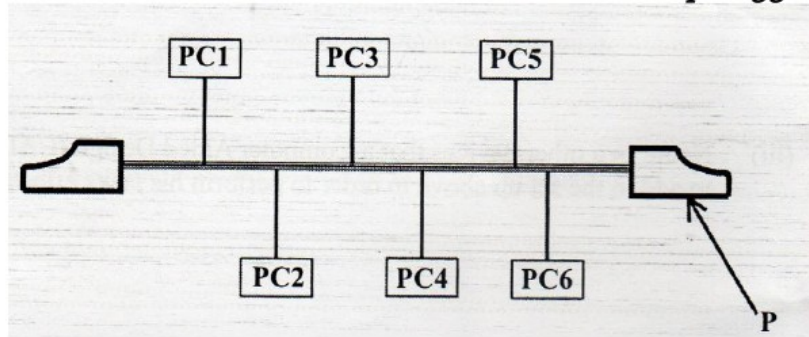
I. Identify the component labelled P.
❖ *The component P is the terminator.*

II. State the function of the component labelled P.
❖ *Terminator in a backbone is used to prevent data signal from bouncing back/absorb signals.*

COMPUTER STUDIES PAPER 2

1. Perfect Pizza Factory manufactures pasta for distribution to restaurants in Nairobi.Assuming that you are now working for the factory and have been given the following sales data:

	A	B	C	D	E	F	G	H	I
1	Restaurants	July	August	September	October	November	December	Total Product Sales	Average
2									
3	Nankos	34567	45671	89650	67222	56113	96282		
4	Burgees	100000	97600	82199	105999	140663	190654		
5	Kenge	96543	97600	82199	105999	140663	190654		
6	Tika	65000	97600	82199	105999	140663	190654		
7	Appetos	103456	97645	82297	105669	140220	175000		
8	Marries	76899	85400	96709	101324	140882	181230		
9	Generals	98000	97600	82199	105999	140663	190654		
10	My Café	25000	19654	15222	8000	5602	200		
11	Shooters	86777	75432	84366	105999	55678	201345		
12									
13									
14	Total Monthly Sales								

(a) **Enter the data shown above into a spreadsheet and save it as Exam 1.(10 marks)**

> *Answer*
>
> Award 1 mark for each of the 10 rows (for correct entries only).

(b) **The sales for Appetos for October have been entered incorrectly, and should be 115669. Update the information in the spread sheet. (3 mark)**

> *Answer*
>
> 115699 to replace 105669.

(c) **Move the row containing Tika's information to the beginning of the list above Nankos. (1 mark)**

> *Answer*
>
> Moving Row 7 to Row 2.

(d) **Delete the blank row after Shooters. (1 mark)**

> *Answer*
>
> Deleting of R12.

(e) **Format all numeric values to 2 decimal places and use comma separators.(2 marks)**

> *Answer*
>
> Formatting to 2 decimal places
> Comma separator

(f)**Use a formula in Column H2 to calculate the Total Sales for the first restaurant.(1 mark)**

> *Answer*
>
> = B2 + C2+ D2 + E2+ F2+ G2

(g) Copy the formula down (he column to calculate the Total Sales for all restaurants. **(I mark)**

> *Answer*
>> Copy of the formula in (f)

(h) Use a formula to calculate the Total Sales for the Month of July. **(2 marks)**

> *Answer*
>> = Sum (B2:B10)

(i) Copy the formula across the row to calculate the totals for the other months.**(1 mark)**

> *Answer*
>> Copy of the formula in (h)

(j) Using an appropriate function, calculate the Average Sales for each restaurant in Column 1. **(3 marks)**

> *Answer*
>> = Average (B2 : G2)

(k) Format Columns H and I to currency with 2 decimal places. **(1 mark)**

> *Answer*
>> Formatting of "Total Product Sales' and 'average' to currency with 2dp.

1) Given that the July sales were 10% above the sales for June in all restaurants:

(i) enter the label *% increment' in cell A16 and a value 10 in cell Bl 6;(1 mark)

> *Answer*
>> Value 10 in cell B 16.

(ii) insert a column before July and use absolute cell referencing to calculate the sales for June; **(5 marks)**

> *Answer*
>> Insertion of a column.
>> Formula C_2*C16.
>> Copy of formula·
>> Saving (file = Exam 2)

(iii save the file as EXAM 2. **(2 marks)**

> *Answer*

(m) Using a formula on cells B17 and B18 respectively, determine:
(i) the number of restaurants whose sales were above 60000 for the month of November; **(2 marks)**

> *Answer*
>> = Count if (G2:G10, ">60 000").

(ii) the maximum sales for the month of December. **(2 marks)**

> *Answer*
>> = Max(H_2: H_{10}).

(n) Create a line graph on a new sheet (monthly sales) using the file EXAM 2 in part (1) above and label the following: (8 marks)

Chart title: Monthly Pasta Sales July-Dec 2005
Y-axis: Total Monthly Sales
X-axis: Month
Legend Position: Right

Answer

Chart sheet.
Data selection.
V chart type.
Chart Title.
Axes title.
Legend placement.

(o) Print EXAM 1, EXAM 2 and the graph in landscape orientation. (6 marks)

Answer

landscape orientation.
hardcopies.

2.The Figure on page 5 shows the design of the cover page of a book. It comprises of the front, the back and space in between where book pages will be attached. Use a desktop publishing package to design the cover page as follows:

(a) Create a new publication named book cover with the following page layout.

(i) paper size: A4,

(ii) orientation: landscape,

(iii) margins: 3 cm or 1.18 inches all round.(4 marks)

Answer

Margin - page layout 4 @ $\frac{1}{2}$ mark each		2
Orientation (order/arrangement of back/spine/front) $\frac{1}{2}$ mark		$\frac{1}{2}$
Paper size $\frac{1}{2}$ mark		
Saving (Book Cover) 1 mark		$\frac{1}{2}$
Fit of the three parts - back, spine and front		1
		1

(b)Enter the text and objects and format them as they appear in the Figure. The front and back sections of the book cover, each measures 18 cm (7.1 inches) by 12.5 cm (4.9 inches) and the space between them measures 1.7 cm (0.7 inches).   (45 marks)

Answer

FRONT COVER	
Authors / Rectangle	
Text typing 1 mark text either case $\frac{1}{2}$ mark	1
Text box positioning/text position at centre $\frac{1}{2}$ mark	$\frac{1}{2}$
Insertion of Rectangle/text-box $\frac{1}{2}$ mark	$\frac{1}{2}$
Fill type (gradient shading)/gradient centre $\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning the rectangle $\frac{1}{2}$ mark	$\frac{1}{2}$
Size $\frac{1}{2}$ mark	$\frac{1}{2}$
Inserting textbox/thick outline border $\frac{1}{2}$ mark	$\frac{1}{2}$
Book title	
text typing (capital) text + title case 1 mark	$1\frac{1}{2}$ **marks**
positioning in relation to the front cover $\frac{1}{2}$ mark	

Activity	Marks
Computer	
Position of the computer $\frac{1}{2}$ mark	$\frac{1}{2}$
Drawing four polygons 4 @ $\frac{1}{2}$ mark	2
Filling polygons 4 @ $\frac{1}{2}$ mark penalise $\frac{1}{2}$ mark for wrong shading	2 marks
Stars	
Six sided star 1 mark / 5 sided and 8 sided $\frac{1}{2}$ mark	1
No outline $\frac{1}{2}$ mark	$\frac{1}{2}$
Fill pattern $\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning star 1 and star 2 @ $\frac{1}{2}$ mark	1
Copying and pasting star $\frac{1}{2}$ mark	$\frac{1}{2}$
Lower rectangle	
Positioning $\frac{1}{2}$ mark	$\frac{1}{2}$
Sizing $\frac{1}{2}$ mark	$\frac{1}{2}$
Outline (bigger) $\frac{1}{2}$ mark	$\frac{1}{2}$
Filling (fill) different from the border $\frac{1}{2}$ mark	$\frac{1}{2}$
Revised edition triangle	
Right angled triangle $\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning $\frac{1}{2}$ mark	$\frac{1}{2}$
Fill (white) - no shade $\frac{1}{2}$ mark	$\frac{1}{2}$
Text typing 1 mark (award $\frac{1}{2}$ mark is test is in one line)	1
Textbox rotation 1 mark	1
Quick revision guide	
Typing text (text & caps + initial) 1 mark	1
Background colour of the textbox $\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning of textbox $\frac{1}{2}$ mark	$\frac{1}{2}$
Nyota Publishing Press	
Typing Text 1 mark Text $\frac{1}{2}$ mark case $\frac{1}{2}$ mark	1
Positioning of textbox $\frac{1}{2}$ mark	$\frac{1}{2}$
Spine	
Typing of text (text & case) 1 mark	1
Rotating 1 mark	1
Positioning of text box $\frac{1}{2}$ mark	$\frac{1}{2}$
Background (fill pattern) $\frac{1}{2}$ mark	$\frac{1}{2}$
Fitting in between $\frac{1}{2}$ mark	$\frac{1}{2}$
Star	
Spine star	
Resizing/ 1 star fitting inside the spine $\frac{1}{2}$ mark	$\frac{1}{2}$
Shading $\frac{1}{2}$ mark	$\frac{1}{2}$
Copying star/existence of the star $\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning $\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning star 2 $\frac{1}{2}$ mark	$\frac{1}{2}$ marks

BACK PAGE
Big rectangle

Outline (thick border)	$\frac{1}{2}$ mark	$\frac{1}{2}$
Fitting	$\frac{1}{2}$ mark	$\frac{1}{2}$
Filling/any fill	$\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning	$\frac{1}{2}$ mark	$\frac{1}{2}$

Rounded rectangle

Outline (none)	$\frac{1}{2}$ mark	$\frac{1}{2}$
Filling (no fill)/ white	$\frac{1}{2}$ mark	$\frac{1}{2}$
Positioning/placement	$\frac{1}{2}$ mark	$\frac{1}{2}$
Sizing/fitting proportional to the rectangle	$\frac{1}{2}$ mark	$\frac{1}{2}$
Correct shape	$\frac{1}{2}$ mark	$\frac{1}{2}$

Text in rounded rectangle

Typing text 4 paragraphs (existence and completeness	@ 1 mark x 4	4
Bullets (style & character)	$\frac{1}{2}$ mark x 2	1
Paragraphing (spacing)	$\frac{1}{2}$ mark	$\frac{1}{2}$
title case -last paragraph	$\frac{1}{2}$ mark	$\frac{1}{2}$

ISBN rectangle

Text ISBN 214s	@ 1 mark	1
Bars varying thickness	@ 1mark	1
Position of ISBN and Bars @	$\frac{1}{2}$ mark	$\frac{1}{2}$
No fill ISBN and bars @	$\frac{1}{2}$ mark	$\frac{1}{2}$ marks

Text at bottom

Copyright symbol	$\frac{1}{2}$ mark	$\frac{1}{2}$
Text and case	1 mark	1
Positioning	$\frac{1}{2}$ mark	$\frac{1}{2}$

(c) Save and print the publication.   **(1 mark)**
   Answer

Printing	1 mark	1 mark