

BOARD OF STUDIES
NEW SOUTH WALES

HIGHER SCHOOL CERTIFICATE EXAMINATION

2000
COMPUTING STUDIES
2 UNIT GENERAL

*Time allowed—Three hours
(Plus 5 minutes reading time)*

DIRECTIONS TO CANDIDATES

- No calculators are to be used.

Section I (20 marks)

- Attempt ALL questions.
- Write your Student Number and Centre Number on the Answer Sheet provided.
- Complete your answers in either blue or black pen on the Answer Sheet provided.

Section II (80 marks)

- Attempt ALL questions.
- Write your Student Number and Centre Number in the spaces provided on the first page of each question.
- Answer the questions in the spaces provided in this paper.

SECTION I

(20 Marks)

Attempt ALL questions.

Each question is worth 1 mark.

Instructions for answering multiple-choice questions

- Complete your answers in either blue or black pen.
- Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample: $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9
A B C D

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D

If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word **correct** and drawing an arrow as follows.

A B C D
correct ↖

USE THE FOLLOWING INFORMATION TO ANSWER QUESTIONS 1, 2 AND 3.

A database on water quality of a stream contains the following data.

DATE	TIME	FLOWRATE	TURBIDITY	DISSOLVED OXYGEN	E.COLI CONTENT
<i>dd mm yy</i>	<i>24 hour</i>	<i>m/s</i>	<i>%</i>	<i>%</i>	<i>ppm</i>
10 11 99	0900	18	18	4	93
11 11 99	0900	20	19	5	111
12 11 99	2030	10	11	17	2000

- 1 How many fields are there in the database?
 - (A) 3
 - (B) 4
 - (C) 5
 - (D) 6

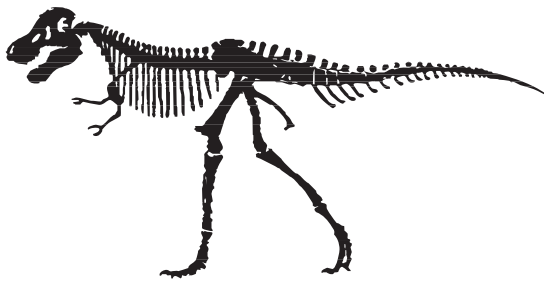
- 2 To display the data taken at a particular time of day you would use
 - (A) an index.
 - (B) a selection.
 - (C) a sequence.
 - (D) a sort.

- 3 The water quality data was entered into the database on a laptop computer as the measurements were made. To electronically transmit this data to a remote central computer you would use a
 - (A) translator and a land-line.
 - (B) signal and a tuple.
 - (C) protocol and bridge.
 - (D) modem and telephone line.

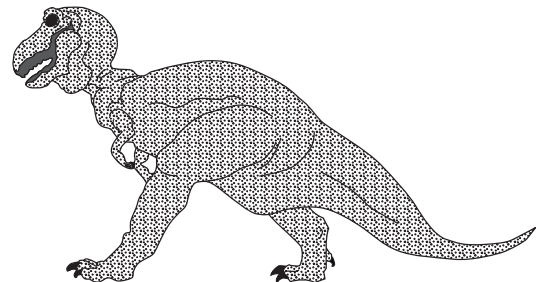
4 Ensuring that information conforms to the data dictionary descriptions is known as

- (A) data integrity.
- (B) data security.
- (C) data validation.
- (D) data verification.

5 Scientists can use fossilised bones and their knowledge of dinosaurs to create images of these extinct creatures.



BEFORE



AFTER

Which type of software would be the most suitable for this purpose?

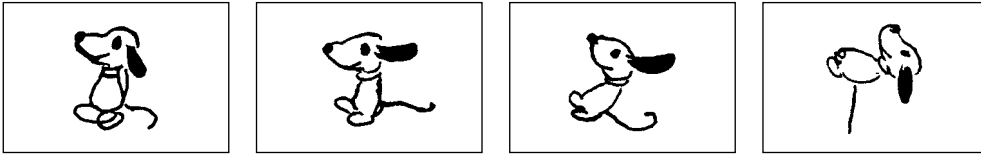
- (A) Bit-mapped
- (B) Charting
- (C) Scanning
- (D) Vector-based

6 A graphics image produced using 256 colours is to be reduced to a 16-colour display.

Which technique may be used to carry out the process?

- (A) Anti-aliasing
- (B) Dithering
- (C) GIF
- (D) Interlacing

- 7 A student produces an animation of his favourite pet using the drawings below.



The animation technique used is

- (A) cel-based animation.
- (B) path-based animation.
- (C) picture-based animation.
- (D) position-based animation.

USE THE FOLLOWING INFORMATION TO ANSWER QUESTIONS 8 AND 9.

TO	B_Freeman@mont.net.ax	
CC	houseinfo@heehee.com.au	
SUBJECT	House Extensions	
SENDER	M_Lamb@boots.com.au	
Attachments	Picture1.JPEG	Picture2.GIF
	Picture3.GIF	Picture4.TIF
Message		
Here are the plans, sketches and photos of our recent house extensions.		

- 8 Attachment Picture2.GIF is stored in graphical interchange format. This standard is used to
- (A) facilitate file conversion filtering across a network.
 - (B) increase the resolution of the graphical data across a network.
 - (C) facilitate the transfer of graphics between applications across a network.
 - (D) increase the transmission speed of the graphical data across a network.
- 9 Who could download this message?
- (A) Only M Lamb
 - (B) Only B Freeman
 - (C) Anonymous FTP servers
 - (D) B Freeman and members of the houseinfo group

- 10** A graphic image created in a painting package is to be inserted into a desktop-publishing document on the same computer.

The most efficient way of doing this is to use

- (A) the clipboard.
 - (B) a graphical interchange format file.
 - (C) a file conversion filter.
 - (D) a data interchange format file.
- 11** What protocol is used to download data from a remote site?
- (A) Data loading protocol
 - (B) File transfer protocol
 - (C) Handshaking protocol
 - (D) File conversion protocol
- 12** Which of the following best describes a gateway?
- (A) A device that provides a central point for a network.
 - (B) A device that accepts a signal from a transmission medium.
 - (C) A device that connects two LANs using the same protocol.
 - (D) A combination of hardware and software that connects networks that use different protocols.
- 13** Which list contains only network topologies?
- (A) Ethernet, ring, bus
 - (B) Token ring, bus, star
 - (C) Ring, bus, star
 - (D) Ethernet, token ring, star

USE THE INFORMATION IN THE FOLLOWING SPREADSHEET TO ANSWER QUESTIONS 14, 15 AND 16.

Four types of fly spray, listed in the table, were tested and the results recorded. Each type of fly spray was tested for the amount of each ingredient it contained. The Knockdown index and the Effectiveness index have been calculated.

	A	B	C	D	E	F	G
1	Product	Ingredient X	Ingredient Y	Ingredient Z	Knock-down index	Effectiveness index	Health hazard index
2	Fly-kill	1.5	7.0	0.11	10.1	0.319	
3	Ded-bug	1.3	8.2	0.15	12.0	0.245	
4	Swat	1.8	7.9	0.05	10.9	0.343	
5	Stomp	1.2	6.5	1.2	11.0	0.334	
6							
7	Effectiveness factor	1.5	0.1	0.8			
8							

- 14 Sprays are considered safe if the amount of ingredient Y is less than 8 and the amount of ingredient Z is less than 0.1. Which formula should be used in cell G2?
- (A) IF (AND(C2 < 8, D2 < 0.1), "SAFE", "NOT SAFE")
 (B) IF (AND(C2 < 8, D2 > 0.1), "SAFE", "NOT SAFE")
 (C) IF (AND(C2 > 8, D2 < 0.1), "SAFE", "NOT SAFE")
 (D) IF (AND(C2 > 8, D2 > 0.1), "SAFE", "NOT SAFE")
- 15 If we sort cells A2 to G5 in *descending* order based on the 'Effectiveness index', what product will appear in cell A4?
- (A) Fly-kill
 (B) Ded-bug
 (C) Swat
 (D) Stomp

- 16 The following formula was initially entered in cell F2 to give the Effectiveness index for Fly-kill.

$$(1.5^{\wedge}B7 + 7.0^{\wedge}C7 + 0.11^{\wedge}D7)/E2$$

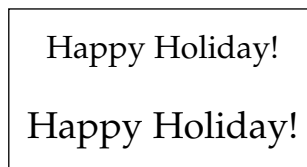
The formula needed to be copied down to cells F3 to F5 to calculate the Effectiveness index for the other fly sprays. To ensure correct results, the formula in F2 had to be changed to:

- (A) $(B2^{\wedge}1.5 + C2^{\wedge}0.1 + D2^{\wedge}0.8)/10.1$
 (B) $(\$B\$2^{\wedge}1.5 + \$C\$2^{\wedge}0.1 + \$D\$2^{\wedge}0.8)/\$E\2
 (C) $(B2^{\wedge}B7 + C2^{\wedge}C7 + D2^{\wedge}D7)/E2$
 (D) $(B2^{\wedge}\$B\$7 + C2^{\wedge}\$C\$7 + D2^{\wedge}\$D\$7)/E2$
- 17 A user wishes to import data from another spreadsheet to her own spreadsheet. She would also like the imported data to be automatically updated when changes are made to the other spreadsheet.

How could this best be achieved?

- (A) Using a data interchange format file
 (B) Using dynamic linking
 (C) Using the clipboard
 (D) Importing the data

18



Which statement correctly describes the *typography* of the two lines in the box?

- (A) The lines have the same type style and font.
 (B) The lines have the same type style but different type faces.
 (C) The lines have different font but the same type face.
 (D) The lines have different type styles but the same font.

19

To get good marks in this examination, remain calm and read the questions carefully.

Which of the following best describes the type face used in the box?

- (A) Serif
- (B) Sans serif
- (C) Bold
- (D) Italics

20 The process of adjusting the horizontal space between some letter combinations to achieve a better fit is called

- (A) kerning.
- (B) leading.
- (C) spacing.
- (D) tracking.

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SECTION II**Marks**

(80 Marks)

Attempt ALL questions.

QUESTION 21 Spreadsheets (16 marks)

(a) Choose terms from the following list to complete the table.

3

absolute cell address	formula	model
clipboard	function	relative cell address
cell pointer	graph	template
file conversion filter	macro	'what if' prediction

<i>Term</i>	<i>Description</i>
	A combination of spreadsheet values, functions and constants
	When copied, reflects the relocation of that cell's position
	To represent or simulate, in mathematical form, a real-life system, activity or process
	Testing a numerical hypothesis by using a spreadsheet
	Used to save time and reduce the chance of keyboard errors in the execution of complicated or lengthy routines within an application
	Designates the cell in a spreadsheet into which the entered information will be placed

Question 21 continues on page 14

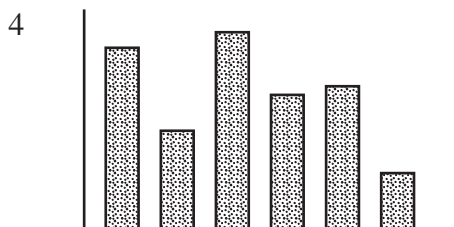
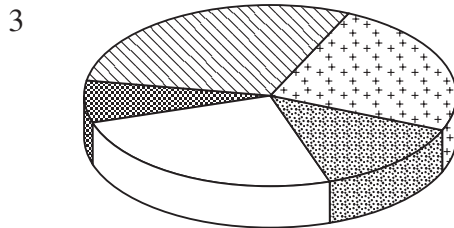
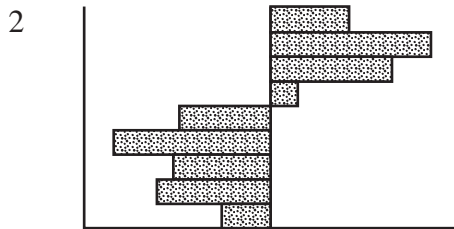
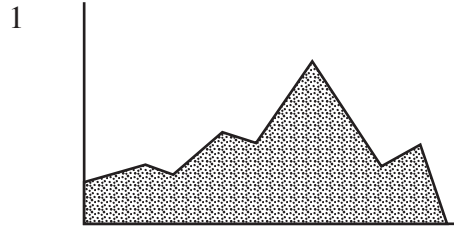
QUESTION 21 (Continued)

Marks

(b)

5

(i) Identify each of the following types of charts.



QUESTION 21 (Continued)

Marks

- (ii) Give ONE example of an arithmetic function and describe how it may be used.

.....
.....
.....

- (iii) Give THREE reasons why functions are used in a spreadsheet.

Reason 1
.....
.....

Reason 2
.....
.....

Reason 3
.....
.....

Question 21 continues on page 16

QUESTION 21 (Continued)

Marks

Use the spreadsheet on the previous page to answer the questions in part (c).

(c) A group of students have formed a share investment club. A spreadsheet has been set up to keep track of their share portfolio. 8

(i) What type of data would you expect to be stored in cells A3 to G3?
.....

(ii) What type of data would you expect to be stored in cells B4 to B10?
.....

(iii) The share value is calculated by multiplying the market unit price by the number of shares. Write an appropriate formula for cell E4.
.....

(iv) The investment club’s net profit from trading in each company’s shares is calculated as follows:

$$\text{net profit} = \text{number of shares} \times \left(\frac{\text{market unit price}}{\text{unit price}} - \frac{\text{purchase unit price}}{\text{unit price}} \right) - \text{brokerage}$$

Write a formula for cell G4.
.....

(v) The content of cell H1 was entered as 0.01. Why is it displayed as ‘1%’?
.....
.....

(vi) The brokerage for each of the companies is calculated by multiplying the brokerage percentage in H1 by the share value. Write a formula for cell F4 so that it can be copied down the F column to calculate the brokerages for all the companies.
.....

Question 21 continues on page 18

QUESTION 21 (Continued)

Marks

- (vii) Some students in this investment club have only limited spreadsheet skills. From time to time they need to sort the data into descending order by net profit. Describe what may be added to the spreadsheet to help these students accomplish this task.

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.....
.....
.....

- (viii) The students are to form smaller groups within the club. Each group will have its own spreadsheet to keep track of its own portfolio. The initial portfolio spreadsheet is to be used as a template. Suggest TWO advantages of doing this, and also any changes that might need to be made to the existing spreadsheet to make it into a template.

Advantage 1

.....
.....
.....

Advantage 2

.....
.....
.....

Change(s)

.....
.....

QUESTION 21 (Continued)

Marks

- (ix) Some students in this investment club prefer to keep track of their portfolio manually. Write down THREE arguments to convince them that the use of an electronic spreadsheet would be more efficient in this case.

Argument 1

.....

.....

.....

Argument 2

.....

.....

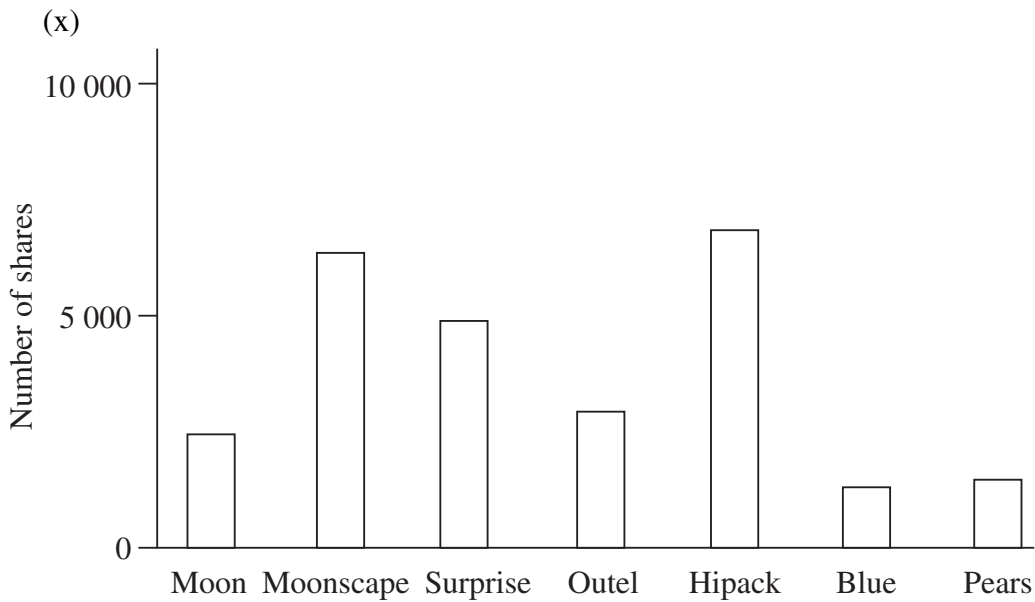
.....

Argument 3

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Write down the ranges of cells that may be used to create this chart.

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QUESTION 22 Databases (16 marks)**Marks**

- (a) Choose terms from the following list to complete the table.

3

clipboard	flat file	primary key
data dictionary	form view	record
data interchange format	logical record	secondary key
file conversion filter	mailmerge	table view

<i>Term</i>	<i>Description</i>
	A field or group of fields that can have a value that is the same for one or more records
	The user's view of a set of related data
	A layout in which a number of records are displayed simultaneously, with corresponding fields arranged in columns
	A description of each field in a database
	A process that translates data stored in a file by an application into a form that is meaningful to another application
	A database consisting of only one file

Question 22 continues on page 22

QUESTION 22 (Continued)

Marks

Use the material below to answer part (b) and part (c).

A regional gallery has a large collection of works. These include paintings (watercolour, oil, acrylic), drawings (pastel, pencil, ink, etchings) and sculptures (metal, stone, wood). Data about these items is currently held on cards, but because of an increase in the number of items being given, or loaned, to the art gallery, the manual system is no longer able to cope, and a computer database is to be set up. A preliminary structure for the database file is as follows:

<i>Field name</i>	<i>Content</i>
Title	
Artist	Surname only
Item group	Paintings, drawings, sculptures
Group type	For paintings – watercolour, oil, acrylic For drawings – pastel, pencil, ink, etchings For sculptures – metal, stone, wood
Curator	Surname of staff member who looks after the group
Security	High, medium, low
Location	Display bay code or storage code
Status	On display, OK but stored, being repaired/restored
Last display date	(If not on display)
Insured value	
Acquired	Bequest, gallery funds, gift, loan
Acquisition date	
Donor/lender	Surname, initials, address
Picture of artwork	Image

(b) (i) What field type should be used for each of the following?

8

- 1 Status
- 2 Security
- 3 Insured value
- 4 Acquisition date

QUESTION 22 (Continued)

Marks

- (ii) Insurance inspectors wish to see the artworks to check that they actually exist. They need a report generated from this database to help with this task. Which fields should be included in the report?

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.....
.....
.....

- (iii) Discuss the security and privacy issues related to including the Donor/lender field in the database.

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- (iv) Database files require one or more fields to be designated as the primary key. Name the combination of fields that may best be used as a primary key.

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.....
.....
.....

- (v) The database could be improved by adding a single field to be used as the primary key. Suggest a name for the field, and describe what its contents would be.

Name

Contents

.....
.....

Question 22 continues on page 24

QUESTION 22 (Continued)

Marks

- (c) (i) Write a search specification for extracting all items insured for more than \$2000 and acquired since 1 June 1995. **5**

.....
.....
.....
.....

- (ii) The gallery has previews of new acquisitions. An invitation must be produced and posted to all donors and lenders of newly acquired art items. For this to work, a change is needed in the structure of the fields of the database.

1 Describe the changes you would make to the database.

.....
.....

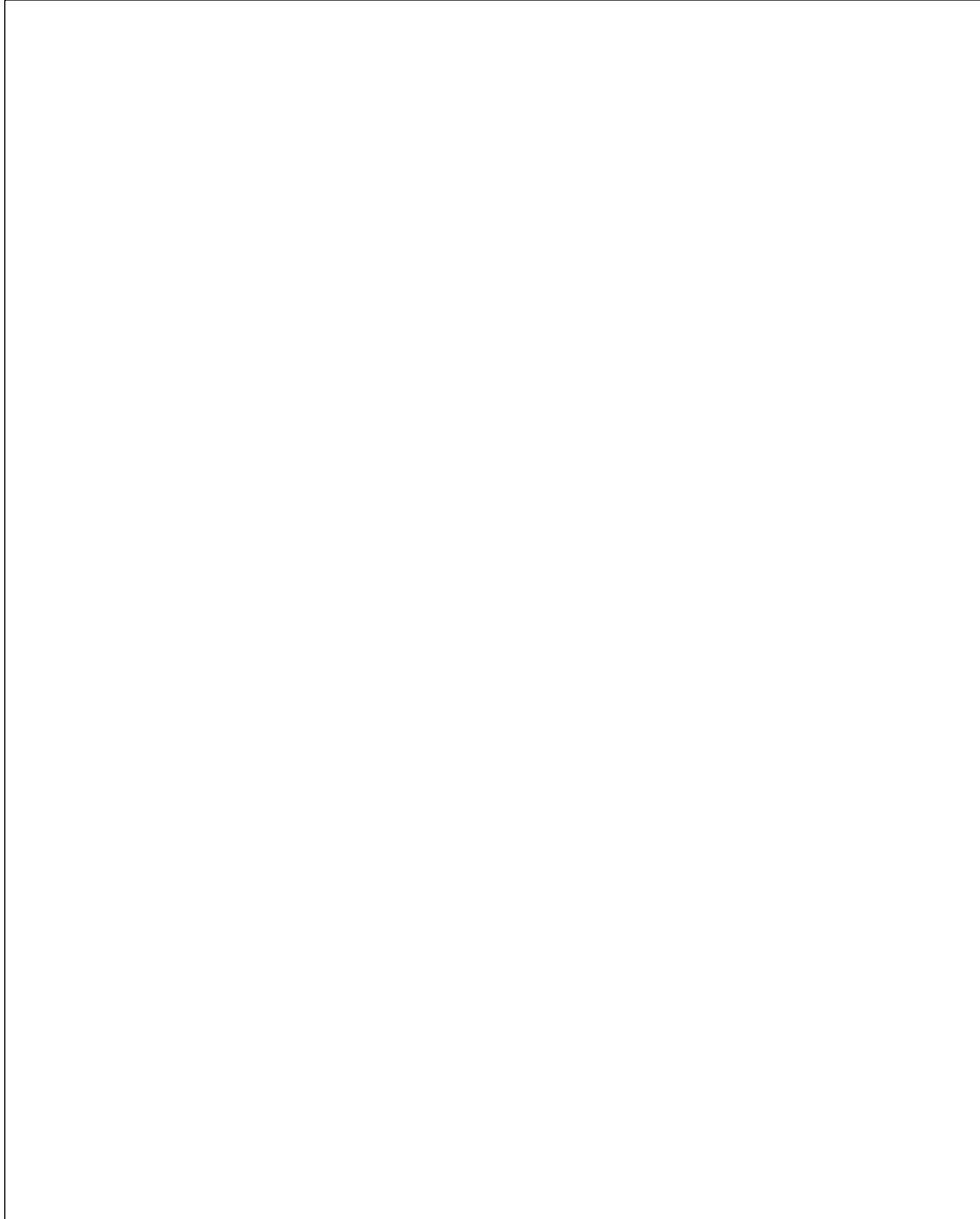
2 Describe how you would create the invitation using the database and a desktop publishing package.

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QUESTION 22 (Continued)

Marks

- (iii) In the space below design a suitable input form screen using the principles of good design.

A large, empty rectangular box with a thin black border, intended for the student to draw a suitable input form screen. The box is oriented vertically and occupies most of the lower half of the page.

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QUESTION 23 Graphics (16 marks)**Marks**

- (a) (i) Choose terms from the following list to complete the table.

5

anti-aliasing	morphing	tweening
cross fade	pixel	VDU
data compression	resolution	warping
gradient fill	story board	
jaggies	storage file	

<i>Term</i>	<i>Description</i>
	A smooth animation, produced by creating intermediate images from a starting image to a final image
	The smallest part of the screen that can be controlled by the computer
	Removal of the 'staircase' roughness of lines and graphics
	Changing a colour gradually while retaining the same intensity
	Reduction of the physical space required for the storage of a graphics file
	The use of a mathematical process to distort an image

Question 23 continues on page 30

QUESTION 23 (Continued)

Marks

(ii) Explain the difference between the following pairs of computer graphics terms.

1 Titling and caption

.....
.....
.....
.....

2 Composite video and RGB

.....
.....
.....
.....

(b) A scientist photographs a collection of dinosaur bones and stores the images in a file called T0.PIT.

7



T0.PIT

(i) What hardware and software would she need?

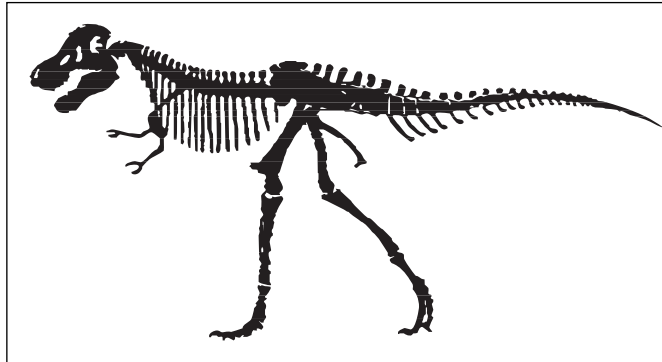
Hardware

Software

QUESTION 23 (Continued)

Marks

- (ii) She then uses an application to reorganise the bones into a dinosaur image and calls the file T1.PIT.



T1.PIT

Would the image be better stored as a bit-mapped or vector image?

.....

Give TWO reasons for your choice.

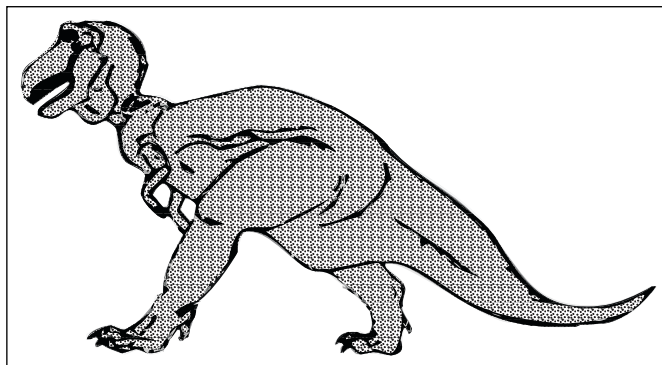
1

.....

2

.....

- (iii) Using an application on her computer, she changes the image from T1.PIT to T2.PIT. List the steps she could take to accomplish this task.



T2.PIT

.....

.....

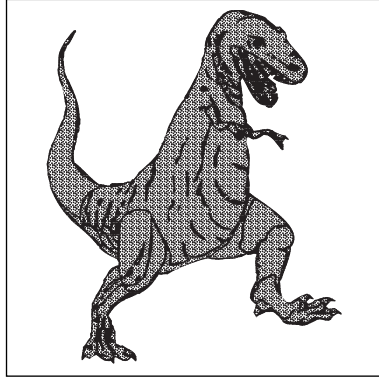
.....

.....

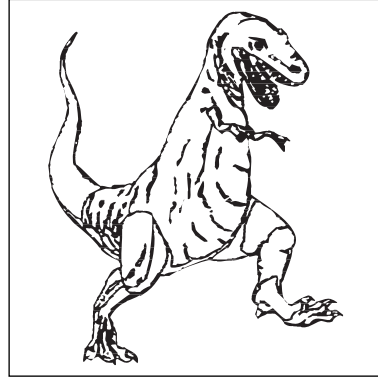
QUESTION 23 (Continued)

Marks

- (iv) She then makes further changes to the image to produce T3.PIT and T4.PIT. What technique has she used in each case, and what problems would she most likely encounter?



T3.PIT



T4.PIT

T2.PIT to T3.PIT

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.....

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T3.PIT to T4.PIT

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QUESTION 23 (Continued)

Marks

- (c) Computer graphics are required to be used in HSC student projects. Select ONE source from EACH group in the list below. 4

Source Group 1

- Family photo album
- Video capture/digital camera
- CD ROM photo images

Source Group 2

- Web site, on-line
- Clip art on disk
- Paint program creations

Answer the following for each source.

(i) Source 1 name

1 What specific hardware and/or software would be required?

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2 What problems might be encountered in using this source?

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QUESTION 24 Desktop Publishing (16 marks)**Marks**

- (a) (i) Choose terms from the following list to complete the table.

5

bold face	drop cap	margin
callout	gutter	master
caption	kerning	stroke weight
clipboard	leading	template

<i>Term</i>	<i>Description</i>
	A document prepared once, but which is to be used over and over again
	A short quotation from a story, which is printed larger than the rest of the story and designed to attract the reader to the story
	A temporary file used to hold text/graphics to allow their easy transfer between applications
	The term used to describe vertical spacing between text
	The amount of space between where the text and graphics appear, and the boundary of a page
	The term used to describe the thickness of the line used to create characters

Question 24 continues on page 38

QUESTION 24 (Continued)

Marks

(ii) When would you use each of the following:

1 a data interchange format file?

.....
.....

2 high resolution when printing?

.....
.....

(b) Explain how you would best overcome each of the following design problems.

5

(i) Rivers of white space run diagonally through the text.

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.....

(ii) In a three-column layout, too many words are hyphenated at the end of the line. (Assume the number of columns cannot be changed.)

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.....
.....

(iii) In a multi-column layout, readers complain that they tend to read across the page rather than down the column. (Assume that the multi-column layout is to remain.)

.....
.....
.....

(iv) The text appears to have holes in it because there is too much space between each full stop and the beginning of the next sentence.

.....
.....
.....

(v) It is hard to identify to which body of text each heading refers.

.....
.....
.....

QUESTION 24 (Continued)

Marks

(c) You have been given the task of producing the Year 12 Newsletter at your school. The articles, graphics and advertisements will be created by teachers and other students, using a variety of software packages. The newsletter will have eight pages. 6

(i) Give TWO reasons for using a page layout software package to produce the newsletter.

Reason 1

Reason 2

(ii) Explain how file conversion filters could be used to produce the text.

.....
.....
.....
.....

(iii) Give TWO advantages of having the document professionally printed.

Advantage 1

Advantage 2

(iv) Give ONE advantage and ONE disadvantage of allowing the use of colour in this document.

Advantage

Disadvantage

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QUESTION 25 Communications (16 marks)**Marks**

(a) Choose terms from the following list to complete the table.

3

asynchronous	modem	protocol
clipboard	optical fibre	repeater
encryption	packet	simplex
half-duplex	packet switching	terminal
LAN	password	WAN

<i>Term</i>	<i>Description</i>
	A network connecting the two offices of a small company on opposite sides of a river
	Improve security by changing text characters to be unreadable without the use of a key
	Sending data in chunks that may take different routes to the final destination
	Communication between two systems that does not depend on the clocks at each end being exactly in step
	A device for converting digital signals to analog, and analog signals to digital
	Transmission of data in one direction only

Question 25 continues on page 42

QUESTION 25 (Continued)

Marks

(b) (i) Explain why a computer network uses a printer server.

6

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.....

(ii) A client asks you whether they should install a star network or a ring network.

1 What is ONE advantage of a star network over a ring network?

.....
.....

2 What is ONE advantage of a ring network over a star network?

.....
.....

(iii) A user wishes to compress the following files:

- eccles.zip
- names.txt
- bottle.jpg
- hugs.exe
- a file produced by PKZIP
- a text file of baby names
- an image in JPEG format
- an application

State the file you would expect to have the best compression ratio, and give your reason.

File

Reason

.....

State the two files you would expect to have the worst compression ratios, and give your reasons.

File 1

Reason

.....

File 2

Reason

.....

QUESTION 25 (Continued)

Marks

- (c) (i) The following two bytes were sent as seven data bits, followed by one even parity bit, and were received with no errors. 7

Fill in the missing bits.

1	0	0	1	0	0	0	
---	---	---	---	---	---	---	--

0	1	1		0	1	0	1
---	---	---	--	---	---	---	---

- (ii) How is the parity bit used to detect errors?

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- (iii) What errors will a parity bit not detect?

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Question 25 continues on page 44

QUESTION 25 (Continued)

Marks

(iv) X-modem and Z-modem are file transfer protocols where the sender transmits packets of data to the receiver and the receiver sends acknowledgements and negative acknowledgements to the sender.

1 How does X-modem use acknowledgements and negative acknowledgements?

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2 How does Z-modem use acknowledgements and negative acknowledgements?

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3 State one advantage of the way X-modem uses acknowledgements and negative acknowledgements.

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4 State one advantage of the way Z-modem uses acknowledgements and negative acknowledgements.

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End of paper