1. Name the methods used to represent information on A, B, C, D and E using the words from the list below.

- Magnetic stripe
- Magnetic ink characters
- Chip
- Optical marks
- Bar code

2. Ring two items which are input devices.

- Buzzer
- Dot matrix printer
- Graph plotter
- Graphic tablet
- Laser printer
- Touch screen

3. Tick TRUE or FALSE next to each of these statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>TRUE</th>
<th>FALSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encryption prevents hackers from deleting data.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Back up procedures prevent hackers from accessing data on a computer.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>You should regularly change your password to make it more difficult for hackers to access your data.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>You should always log off after using a networked computer.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>You should always tell a friend your password in case you forget it.</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
4. Draw five lines on the diagram to match the software to how it could be used.

<table>
<thead>
<tr>
<th>Software</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop publisher</td>
<td>suggesting medical diagnoses</td>
</tr>
<tr>
<td>Measuring program</td>
<td>storing pupil records in a school</td>
</tr>
<tr>
<td>Spreadsheet</td>
<td>producing a school magazine</td>
</tr>
<tr>
<td>Inference engine</td>
<td>monitoring temperature in a science experiment</td>
</tr>
<tr>
<td>Database</td>
<td>managing personal finance</td>
</tr>
</tbody>
</table>

5. Select the most suitable data type from the list to represent:

(a) the number of children in a family  Numeric (Integer)
(b) a line of a company’s address      Alphanumeric
(c) the gender of a person             Boolean
(d) somebody’s birthday                Date

Alphanumeric             Boolean             Date
Numeric (Integer)         Numeric (Real)

6. A floor turtle can use the following instructions:

<table>
<thead>
<tr>
<th>INSTRUCTION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORWARD ( n )</td>
<td>Move ( n ) mm forward</td>
</tr>
<tr>
<td>BACKWARD ( n )</td>
<td>Move ( n ) mm backward</td>
</tr>
<tr>
<td>LEFT ( t )</td>
<td>Turn left ( t ) degrees</td>
</tr>
<tr>
<td>RIGHT ( t )</td>
<td>Turn right ( t ) degrees</td>
</tr>
<tr>
<td>PENUP</td>
<td>Lift the pen</td>
</tr>
<tr>
<td>PENDOWN</td>
<td>Lower the pen</td>
</tr>
</tbody>
</table>
Complete the set of instructions to draw this shape by filling in the blank lines.

PEN DOWN
LEFT 90
FORWARD 35
RIGHT 90

Forward 80
Right 90
Forward 180
Right 90
Forward 70
Pendown
Forward 10
Pendown
Right 90
Forward 80
(Left 90)

1 mark for each pair of statements [5]

7 Two types of network topology have been combined to form a larger network.

(a) Give the name of the type of the larger network topology ................................................... [1]

(b) Give the names of the other two types of topology in this network.

1 ................................................................. Star ................................................................. [2]

2 ................................................................. Bus .................................................................
(c) Complete each sentence below using one item from the list.

A bridge  A hub
A proxy server  A switch

A hub (i) ........... ........... does not manage any of the data traffic through it.
A switch (ii) ........... ........... forwards data packets to computers and printers.
A proxy (iii) ........... ........... can be a major component of a firewall.
A bridge (iv) ........... ........... usually only has two ports. [4]

8 Tick TRUE or FALSE next to each of these statements which describe the use of e-mail compared to the normal postal service.

| E-mails can only be sent using a Post Office. | TRUE | FALSE |
| You don’t have to leave your house to send e-mail. | TRUE | FALSE |
| It is quick to send the same message to many people using e-mail. | TRUE | FALSE |
| It takes a long time for an e-mail to arrive. | TRUE | FALSE | [4]

9 Put a tick in the column which best describes the type of processing used in the following applications.

| A burglar alarm system. | Real Time | Batch |
| Producing gas bills. | | Real Time |
| Cooking with an automatic cooker. | Real Time | |
| Scanning OMR sheets. | Real Time | Batch | [4]
A book shop owner uses a spreadsheet to calculate profits. This is part of the spreadsheet.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ISBN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>22</td>
<td>29</td>
<td>7</td>
<td>32</td>
<td>224</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>26</td>
<td>35</td>
<td>9</td>
<td>45</td>
<td>405</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>15</td>
<td>21</td>
<td>6</td>
<td>32</td>
<td>192</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>33</td>
<td>41</td>
<td>8</td>
<td>89</td>
<td>712</td>
</tr>
</tbody>
</table>

(a) Which row contains labels?  
Row 1  

(b) Give the cell reference of the cell that contains 0-74-879116-7.  
A4  

(c) Give the cell reference of a cell that contains numeric data.  
Any cell in the range B2 to F5  

(d) Write down the formula which has been entered in cell F2.  
=D2*E2  

(e) When the spreadsheet was created a similar formula had to go in cells F3 to F5. Tick three methods that could have been used to achieve this, leaving F2 unchanged.

<table>
<thead>
<tr>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut and paste</td>
</tr>
<tr>
<td>Fill down</td>
</tr>
<tr>
<td>Copy and paste</td>
</tr>
<tr>
<td>Dragging the fill handle down</td>
</tr>
<tr>
<td>Transposing the cells</td>
</tr>
<tr>
<td>Absolute cell referencing</td>
</tr>
</tbody>
</table>
11 Raquel Lopez owns a chain of car repair garages. She keeps records of all her customers. She has employed a systems analyst to recommend a new computer system for her business. The first task the analyst will undertake is to analyse the existing system.

(a) Give four methods of analysing the existing system.

1. Using questionnaire to obtain user opinion and problems

2. Conducting interviews with key staff

3. Examining existing documents to find out details about data

4. Observe the current system in action

(b) Details of each customer need to be entered into the computer. Give one reason why this data will need to be verified.

To detect typing errors in data/data entry errors/transcription errors

(c) Name and describe one method of verification.

Either:
Visual verification (1) as typed in data and visually compared with original data (1)

Or
Double entry (1) and date is typed in twice and computer program compares the two versions (1)

(d) The systems analyst decides that the system needs to have a screen input form to enter all the details of each customer. Name four data items that would be included in such a form.

1. Name, Customer number/id, Address, Post code, (Work/Mobile) phone number, (Home/Mobile) phone number

2. Email address, Car registration number(s),

3. 

4. 

Four from:

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
(e) Describe four features that would help a user to navigate between input forms.

1. ................................................................. .................................................................

Four from:
2. Button to close form .................................................................
   Button to first record/form .................................................................
   Button to end of file/new record .................................................................
   Button to previous record/form .................................................................
   Button to next record/form .................................................................
   Submit/continue button .................................................................
3. Space to enter required record number .................................................................
   Search facility/engine .................................................................
   Button to go to sub forms .................................................................

(f) The systems analyst now designs the file structure. Tick three items which would need to be designed as part of the file structure.

<table>
<thead>
<tr>
<th>Field names</th>
<th>✔</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input screen</td>
<td></td>
</tr>
<tr>
<td>Print format</td>
<td></td>
</tr>
<tr>
<td>Validation routines</td>
<td>✔</td>
</tr>
<tr>
<td>Field lengths</td>
<td>✔</td>
</tr>
<tr>
<td>Hardware and software required</td>
<td></td>
</tr>
</tbody>
</table>

(g) Name three methods of implementing this new system.

1. ................................................................. .................................................................

Three from:
2. Parallel running .................................................................
   Pilot running .................................................................
3. Phased implementation .................................................................
   Direct changeover .................................................................

(h) After the system is implemented it will be evaluated. Tick three items which should be present in the evaluation.

<table>
<thead>
<tr>
<th>Printouts of the results of queries</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The appropriateness of the solution</td>
<td>✔</td>
</tr>
<tr>
<td>Comparing the solution with the original task requirements</td>
<td>✔</td>
</tr>
<tr>
<td>Program listing</td>
<td></td>
</tr>
<tr>
<td>Any improvements which can be made to the system</td>
<td>✔</td>
</tr>
<tr>
<td>System flowcharts</td>
<td></td>
</tr>
</tbody>
</table>
Companies in the nuclear industry often use simulations because to experiment with nuclear material would be too dangerous.

(a) Give two other examples of computer modelling which are used to minimise danger.

1. 
Flight/pilot simulation/training
Large scale chemical experiments
Design of fairground rides - Design of large buildings/bridges
Traffic control - Building fire simulation - Car driving

(b) Other than minimizing danger, give three reasons why computer models are used rather than the real thing.

1. 
Real thing may be too expensive to build
Real thing requires too large a time scale
Real thing would be too wasteful of materials
Real thing is too vast a scale
Real thing may occur too rarely

2. Rate of change can be adjusted for human eye to detect
Corrections can be made if mistakes in real thing/amendments are easier in a model

13 Tick four items which must be part of an expert system.

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar code reader</td>
</tr>
<tr>
<td>Spreadsheet</td>
</tr>
<tr>
<td>Dot matrix printer</td>
</tr>
<tr>
<td>Inference engine</td>
</tr>
<tr>
<td>Interactive input screen</td>
</tr>
<tr>
<td>Knowledge base</td>
</tr>
<tr>
<td>Rules base</td>
</tr>
<tr>
<td>Search engine</td>
</tr>
</tbody>
</table>
The prolonged use of computers can lead to health and safety problems.

(a) Tick two health problems that may be caused by prolonged use of computers.

<table>
<thead>
<tr>
<th>Problem</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RSI</td>
<td>✔</td>
</tr>
<tr>
<td>Influenza virus</td>
<td></td>
</tr>
<tr>
<td>Blood poisoning</td>
<td></td>
</tr>
<tr>
<td>Headaches</td>
<td>✔</td>
</tr>
</tbody>
</table>

(b) Tick two ways of preventing health problems.

<table>
<thead>
<tr>
<th>Way</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sit far away from the monitor</td>
<td></td>
</tr>
<tr>
<td>Sit in a comfortable chair</td>
<td></td>
</tr>
<tr>
<td>Take regular breaks</td>
<td>✔</td>
</tr>
<tr>
<td>Put a screen filter in front of the monitor</td>
<td>✔</td>
</tr>
</tbody>
</table>

(c) Tick two safety problems that may be caused by the use of computers.

<table>
<thead>
<tr>
<th>Problem</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Back problems</td>
<td></td>
</tr>
<tr>
<td>Electrocution</td>
<td>✔</td>
</tr>
<tr>
<td>Fire</td>
<td>✔</td>
</tr>
<tr>
<td>Hacking</td>
<td></td>
</tr>
</tbody>
</table>

(d) Tick two ways of preventing safety problems.

<table>
<thead>
<tr>
<th>Way</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t overload electrical sockets</td>
<td>✔</td>
</tr>
<tr>
<td>Make sure there are no bare wires</td>
<td>✔</td>
</tr>
<tr>
<td>Use an expert system</td>
<td></td>
</tr>
<tr>
<td>Use anti-virus software</td>
<td></td>
</tr>
</tbody>
</table>

---

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
15 Computers are used to manage data in libraries. Name the different methods used to input data about books and borrowers and discuss the advantages and disadvantages of these.

Three from:
Keyboard/typing in data
A bar code (reader)
A magnetic stripe (reader)
Touch screen

Three from:
Scanning bar codes/swiping magnetic stripes/touch screen gives fast data entry/keying in data can be slow
Scanning bar codes/swiping magnetic stripes/touch screen reduces errors/keying in data can lead to data errors
Keyboards/touch screens are robust/bar codes can be flimsy
Magnetic stripes are more robust than bar codes

16 A hospital uses computers to monitor the health of patients.

(a) Give three advantages of using computers rather than nurses to do this.

Three from:
Reduced cost of wage bill
Computer readings are more accurate/human errors are reduced
Readings can be taken more frequently/continuously
Nurses can get tired and forget to take readings
Nurses are so busy they might not be able to take readings regularly
Nurses won’t be exposed to contagious diseases
Automatic warnings can be generated
Graphs can be produced automatically
Nurses can be freed up to do other tasks
(b) Explain why analogue to digital conversion is needed when computers are used in monitoring and measuring.

Four from:
Sensors are used (to generate data)
Data are then sent to computer
Sensors read analogue data
Computers work with digital data only
Data needs to be converted so computers can process/understand data

17 Many companies use video conferencing instead of face-to-face conferencing. Discuss the advantages and disadvantages of this.

Six from:
Advantages
Workers can use own office so documents do not get lost in transit/bulky documents/equipment
do not have to be carried around
Company can call meeting at short notice
Employees can work from home
Company does not have to pay travelling expenses
Company does not have to pay hotel expenses
Company does not have to pay for conference room facilities
Travelling time is saved
Might be dangerous to fly/travel
Disabled people may find it difficult to travel

Disadvantages
Takes time to train employees
Difficult to call international meetings because of time differences
Initial cost of hardware
Equipment can break down
Strength of signal/bandwidth can be a problem/connection can be lost/power cuts
Loss of personal/social contact
Takes time for workers to learn new technology
Can’t sign documents

Max. 4 advantages/disadvantages
One mark available for reasoned conclusion

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
Describe four advantages that the use of chip and pin systems have over a magnetic stripe system.

Four from:
- Data more difficult to copy
- Extra layer of security with PIN number
- Even if stolen card cannot be used unless thief knows PIN number
- Larger amount of information can be stored
- Disabled people find it easier than signing
- Reduces disputes at checkouts over validity of signature
- Saves time at checkouts
- Not affected by magnetic fields

A company wants all its offices to be able to communicate using ICT systems. They are considering using fax, email and bulletin boards. Discuss the advantages and disadvantages of these methods.

Eight from:
Fax
- Advantages
  - Can be used as a legal document
  - Documents can be very long
- Disadvantages
  - Cannot be certain if correct person has received it
  - Very slow transmission rates
  - Not very good quality
  - Documents cannot be edited easily
  - Cannot send multimedia files
  - Won't be received if line is busy/receiving fax machine switched off/out of paper
  - Wastes/expense of ink/paper

Email
- Advantages
  - Can be confident message will only go to the correct person (if addressed correctly)
  - Fast transmission times
  - Attachments can be downloaded and edited
  - Easier to send large documents
  - Some systems have limits to size of attachments
  - Addresses more difficult to remember than phone numbers
- Disadvantages
  - Description of how phishing can occur
  - Description of how viruses can be transmitted

Bulletin boards
- Advantages
  - You don’t need an ISP
  - Messages can be moderated
  - Automatically creates an archive
- Disadvantages
  - Lack of privacy (every member of the group can see every message)
  - In older systems only one person can be online at one time
  - Doesn’t alert you to incoming messages

One mark available for reasoned conclusion