READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of THREE sections and TWELVE questions. Answer ALL questions.

2. Write your answers in the spaces provided in this booklet.

3. Do NOT write in the margins.

4. Code is to be written in Pascal.

5. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. Remember to draw a line through your original answer.

6. If you use the extra page(s) you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.
SECTION I
THEORY – 60 marks
Answer ALL questions.

1. (a) Write the appropriate name for the IT professional who performs EACH of the following functions.

(i) Determines access privileges for users of the database

.......................................................................................................................... (1 mark)

(ii) Repairs malfunctioning computer equipment

.......................................................................................................................... (1 mark)

(b) Describe the function of EACH of the following units found in a computer system.

(i) Control unit

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......................................................................................................................... (2 marks)

(ii) Arithmetic-logic unit

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..........................................................................................................................
......................................................................................................................... (2 marks)

(iii) Central processing unit

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......................................................................................................................... (1 mark)

GO ON TO THE NEXT PAGE
(c) In the box below, draw a diagram showing the relationship between the control unit, arithmetic-logic unit and central processing unit.

(3 marks)

Total 10 marks
2. Convert EACH of the following data from the number system specified to its decimal equivalent. (Show all steps in calculations.)

(a) \(110_2\)

(b) \(A9_{16}\)

(c) \(25_8\)

(d) 0011 0000, as a binary coded decimal (BCD)

Total 10 marks
3. A technician was checking a computer to see if it needed replacement parts. State the specification for EACH component indicated in (a) to (c) as required.

(a) Intel Pentium IV 64 bit 3.6 GHz

(i) The word size

(ii) The processor type

(iii) The processor speed

(b) 2GB 533MHz SDRAM

(i) The type of RAM

(ii) The memory capacity

(iii) The speed
(c) 160GB SATA HDD 7200 rpm

(i) The storage device described

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(1 mark)

(ii) The storage capacity

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(1 mark)

(iii) The speed

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(1 mark)

(iv) The device interface

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(1 mark)

Total 10 marks
4. (a) Identify ONE input OR output device that is useful for each of the following situations.

(i) Used by the visually impaired

.................................................................................................................................................. (1 mark)

(ii) Used by the hearing impaired

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(iii) To fly a simulation program

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(iv) To produce an electronic signature

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(b) (i) The diagram below represents a storage device. Draw and label a sector and a track on the diagram.

.................................................................................................................................................. (4 marks)

(ii) State ONE secondary storage device that uses sectors and tracks to store data and programs.

.................................................................................................................................................. (1 mark)

(iii) Identify ONE device interface that is suitable for connecting internal storage devices.

.................................................................................................................................................. (1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE
5. The following scenario describes an example of an automated (computerized) application in an industrial information processing system. Use the scenario to answer the questions that follow.

This application reads in data about the heat generated in a reactor of an industrial plant.

Instructions are sent to a device.

Users can determine whether the reactor is working efficiently in regulating the flow of water that cools the reactor.

(a) Identify ONE example of
(i) data that can be entered
.................................................................................................................
(1 mark)

(ii) an input device used to enter the data.
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(1 mark)

(b) Identify ONE example of
(i) information that is output
.................................................................................................................
(1 mark)

(ii) a suitable output device.
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(1 mark)

(c) State whether the processing in the scenario above is batch, online or real-time. Provide ONE reason for your answer.

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(2 marks)
(d) State ONE other example of an automated information processing system.

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(1 mark)

(e) List THREE advantages of using an automated information processing system over the corresponding manual system.

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(3 marks)

Total 10 marks
6. Read the following scenario and answer the questions that follow.

The BBB Company uses a computerized system for ordering items as follows:

- The data entry clerk enters the names of the items required and the amount needed on a paper-based request form.
- The data entry clerk then enters the data into the computer system.
- The administrative assistant re-enters the data from the form into the computer system.
- The computer system outputs a report indicating if data entered by the data entry clerk is the same as the data entered by the administrative assistant.
- The administrative assistant makes any corrections as necessary.
- The computer system then produces a purchase request.

(a) State

(i) the technical term for the original document in the scenario

(ii) whether the original document is machine readable or human readable

(b) State the term used for re-entering the data into the system. Explain why this is a useful method.
(c) Name the file organization structure MOST suitable to access and store the purchase requests. Give ONE reason to justify your answer.

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(2 marks)

(d) Identify the storage device that is MOST suitable to store the data from the purchase requests. Give ONE reason to justify your answer.

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(2 marks)

(e) State ONE data check and explain how it can be used to confirm that the data entered is accurate.

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(2 marks)

Total 10 marks
7. Read the extract below and answer the questions that follow.

Digital Forensics: An Integrated Approach

Abstract

As cyber crimes become more pervasive in today’s society, governments and private entities grapple with the need to implement control systems. Legislation, policies and guidelines are rapidly being developed by parliament and boards in an effort to stop these crimes from spiralling out of control.

Digital forensics, and to an extent e-discovery, have become an integral part of the enforcements in tackling these cybercrimes. The rapid evolution of digital devices has had a significant impact on the digital forensics community with digital crimes evolving just as rapidly. Court proceedings worldwide are now encountering a number of cases where, despite their focus and origin, some form of digital evidence is involved.

(a) State:

(i) THREE formatting features used in the document.

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

(3 marks)

(ii) The number of paragraphs after EACH of the following tasks is performed

<table>
<thead>
<tr>
<th>Task</th>
<th>Paragraph 2 is moved below Abstract as the new paragraph 1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paragraph 1 is copied and placed below paragraph 1.</td>
<td></td>
</tr>
</tbody>
</table>

(2 marks)
(iii) The reason why the word “spiralling” was underlined by the software

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

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

(1 mark)

(b) Using the search and replace option, all occurrences of cyber are to be changed to cybercrime. State the result after this change.

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

(1 mark)

Total 7 marks
8. Consider the following table which consists of a sample of items in a supermarket, their cost and corresponding barcode.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Barcode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange Juice</td>
<td>$6.50</td>
<td>XY54B6</td>
</tr>
<tr>
<td>Grape Juice</td>
<td>$8.25</td>
<td>MD77H7</td>
</tr>
<tr>
<td>Water</td>
<td>$4.00</td>
<td>DC68A2</td>
</tr>
<tr>
<td>Soda</td>
<td>$5.00</td>
<td>AB44C3</td>
</tr>
</tbody>
</table>

(a) Complete the following database structure for the table above.

<table>
<thead>
<tr>
<th>FieldName</th>
<th>Datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Barcode</td>
<td></td>
</tr>
</tbody>
</table>

(b) State:

(i) The field that can be used as a primary key

(ii) A suitable size for the barcode field

(iii) The result of a query that finds all items that cost less than $5.00

(iv) The field name and order of the sorted records in the table

Total 8 marks
NOTHING HAS BEEN OMITTED.
SECTION III

PROBLEM SOLVING AND PROGRAMMING – 45 marks

Answer ALL questions.

9. (a) Study the algorithm below and answer the questions that follow.

<table>
<thead>
<tr>
<th>Line</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total = 0</td>
</tr>
<tr>
<td>2</td>
<td>While Total &lt;= 5</td>
</tr>
<tr>
<td>3</td>
<td>Prompt to enter name of subject</td>
</tr>
<tr>
<td>4</td>
<td>IF Subject already entered</td>
</tr>
<tr>
<td>5</td>
<td>THEN Prompt to enter another subject</td>
</tr>
<tr>
<td>6</td>
<td>IF Total = 3</td>
</tr>
<tr>
<td>7</td>
<td>THEN Give 5% Discount</td>
</tr>
<tr>
<td>8</td>
<td>Total = Total + 1</td>
</tr>
<tr>
<td>9</td>
<td>ELSE Total = Total + 1</td>
</tr>
<tr>
<td>10</td>
<td>END WHILE</td>
</tr>
<tr>
<td>11</td>
<td>Display Total</td>
</tr>
</tbody>
</table>

(i) Identify ONE line in the algorithm above which contains each item in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Line Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>An assignment statement</td>
<td></td>
</tr>
<tr>
<td>Start of a loop</td>
<td></td>
</tr>
<tr>
<td>An output statement</td>
<td></td>
</tr>
<tr>
<td>A condition</td>
<td></td>
</tr>
<tr>
<td>A relational operator</td>
<td>(5 marks)</td>
</tr>
</tbody>
</table>
(ii) Complete the following trace table using the algorithm on page 18.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Discount</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>English B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodwork</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(5 marks)

(b) State ONE suitable data type for EACH of the following variables:

(i) STUDENTS ← 20

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

(1 mark)

(ii) FEESPAID ← 'Y'

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

(1 mark)

(iii) AVGMARK ← MARK/3

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

(1 mark)

(iv) GRADE[1] ← 56

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

(1 mark)

(c) Identify the variable in Part (b) that is NOT an elementary data type.

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

(1 mark)

Total 15 marks
10. Consider the following algorithm.

```
** Algorithm SUBJECT_ENTRY

Line 1: Declare variables and constants
Line 2: Discount = 0.05
Line 3: Total = 0
Line 4: SubjectCode = ""

Line 5: While Total <= 5 and (SubjectCode <> 'X')

Line 6: Prompt to enter one-character code of subject
Line 7: Accept SubjectCode
Line 8: Total = Total + 1

Line 9: IF Total = 3
Line 10: THEN Display ('5% Discount Due')
Line 11: IF SubjectCode <> "X"
Line 12: THEN Add 1 to SubjectCode
Line 13: ELSE Display the number of subjects

Line 14: END WHILE

Line 15: Display Total

Line 16: End of algorithm
```

GO ON TO THE NEXT PAGE
Using the algorithm on page 20, complete the following Pascal program by filling in spaces (1) to (10).

```
function subject_entry;
(1)
Const Discount ______________ 0.05;
(2)
Var Total : ______________;
(3)
SubjectCode: char;
Begin
Total := 0 ______________
(4)
SubjectCode := ' '; 
While (Total <= 5) and (SubjectCode <> 'X') ______________

Begin
_____________('Enter code of subject');
(6)
Readln(_______________);
(7)
_____________ Total = 3
(8)
Then Writeln('5% discount due');
If SubjectCode <> 'X'
Then Total := Total ______________ 1
(9)
else Writeln(total);
End;
_____________.
(10)
```
11. Consider the programming code in the following table. Example 1 and Example 2 are different versions of the same instructions.

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCEPT</td>
<td>ACC</td>
<td>1000</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>DIS</td>
<td>0111</td>
</tr>
<tr>
<td>NUMBER</td>
<td>NUM</td>
<td>1010</td>
</tr>
<tr>
<td>TEXT</td>
<td>TEX</td>
<td>0101</td>
</tr>
</tbody>
</table>

(a) State the programming language generation used in Example 2.

.................................................................................................................. (1 mark)

(b) Write the generic name of the programming language illustrated in

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
</table>

.................................................................................................................. (2 marks)

(c) Answer the following questions based on code written using Example 1.

ACC NUM ACC TEX DISP NUM

(i) Identify the error in the code.

.................................................................................................................. (1 mark)

(ii) Correct the error by stating the code that should be used.

.................................................................................................................. (1 mark)
(iii) State the technical term for EACH of the following:

- The original programming code
  -
- Locating errors in a program
  -
- Type of error found in the code given in part (c)
  -
- Conversion to the code in Example 2
  -

(4 marks)

(iv) Rewrite the code in (c) using the instruction column in the table on page 22.

- 
- 
- 
- 

(5 marks)

(v) The corrected code was executed. Write the output when the following data were entered by a user.

56
Passed

(1 mark)

Total 15 marks
The following one dimensional array was used to store the number of subjects studied by a group of students.

**SUBJECTS: ARRAY[1..15] of integer;**

(a) State:

(i) The size of the array

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

(1 mark)

(ii) The data type of the array

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

(1 mark)

(b) Some of the contents of the array are illustrated in the following table.

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>6</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
</table>
|...| 7 | 8 | 9 | 10| 11| ...

(i) Write the term INDEX in the appropriate location in the table above. (1 mark)

(ii) Explain the meaning of the numbers in the shaded column.

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(2 marks)

Total 5 marks

*END OF TEST*

*IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.*