Directions to Candidates:

Answer ALL questions in Section A on this paper;
Answer BOTH questions in Section B on separate foolscaps;
The use of flow chart template is permitted;
Calculators are NOT allowed;
Good English and orderly presentation are important.
Section A - Answer all Questions

1 (a) What is data verification?

Verification: 

(b) Check digits and range checks are two types of validation checks.
   i. What is check digit?
   ii. What is a range check?
   iii. Give a practical example where range checking can be suitable.

Check digit: 

Range check: 

Example: 

2 Below are a logic circuit and its truth table. Two gates in the logic circuit are represented by circles.

![Logic Circuit Diagram]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<td>0</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

(a) Study the circuit and truth table. Then write the name of the gate in each circle.

(b) Write down the Boolean expression which represents the circuit above.

Expression: \( F = \)

(c) Refer again to the truth table above. If logic 0 is represented by false and logic 1 by true, complete the following statement for the output of the circuit:

Output F is true only if input A is 

3 (a) Using twos complementation represent the following two decimal numbers in 8 bits:

i. 45

ii. -73

45: 

-73: 

Working space:

(b) The following two 8-bit binary numbers, 1011 0011 and 0110 0000, are added together.

i. What is the name of the error if the result of addition is stored in an 8-bit register?

ii. What other type of arithmetic operation (subtraction, division or multiplication) on the same two numbers would also result in the same type of error?

Error: 

Arithmetic operation: 

(c) What is the minimum number of bits required to store a character set made up of the English alphabet (26 letters) both in capital and in small letters?

Number of bits: 

4 (a) Application packages may be off-the-shelf, customisable or tailor-made. Give one advantage of each type of package when compared to the others.

Off-the-shelf: 

Customisable: 

Tailor-made: 

(b) Why do programmers prefer a 4GL (4th Generation Language) when developing certain applications?

4GL: 


(c) What is **software licensing**?

**Software licensing:** ________________________________

5 (a) Distinguish between: **user**, **technical** and **program documentation**.

**User:** ________________________________

**Technical:** ________________________________

**Program:** ________________________________

(b) Give **two items** of information one can find in the program documentation.

1st item: ________________________________

2nd item: ________________________________

6 (a) **Syntax** and **logical** errors are two types of programming errors.

i. Distinguish between the two types of errors.

ii. For each type of error give an example.

**Syntax:** ________________________________

**Example:** ________________________________

**Logical:** ________________________________

**Example:** ________________________________

(b) What is meant by **dry running** a programming?

**Dry run:** ________________________________

7 The **central processing unit** is made up of two subunits; the **arithmetic logic unit** (ALU) and another subunit.

i. What is the other **subunit** called?

ii. Briefly explain the **function** of both subunits.

iii. Name one register found in each unit.

**Name of subunit:** ________________________________

**Function of ALU:** ________________________________
Function of subunit: 

Register in ALU: 

Register in subunit: 

8 (a) **POS and CAL** are acronyms used for two computer applications. What does each acronym stand for?

**POS:** 

**CAL:** 

(b) The left column of the table below shows three **areas of computer applications**. From the following list, write down the most suitable **example** for each area.

<table>
<thead>
<tr>
<th>CAD-CAM</th>
<th>Stock control</th>
<th>Weather forecasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial data processing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9 (a) Programming languages may be divided into **generations**. This is the order in which they were developed. First we had the 1<sup>st</sup> generation of languages (1GL), then came the 2<sup>nd</sup> generation (2GL), the 3<sup>rd</sup> generation (3GL), and so on. Highlight one main **difference** between these three generations.

**1GL:** 

**2GL:** 

**3GL:** 

(b) What is meant by the **fetch execute cycle**?

**Fetch Execute Cycle:** 

10 (a) Write one statement in **Pascal** to store in variable **Y**, the **remainder** of variable **E** divided by variable **F**.
Write a program in **Pascal** to input, find and display the **sum** of five integer numbers using a **loop**. Each time one number is inputted during runtime, the sum at that instant in time has to be displayed.

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i. What is the difference between **WWW** and the **Internet**?

ii. Mention two **risks** a person may encounter when using the Internet.

iii. What is **e-government**?

**Difference:**

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1st Risk:

---

2nd Risk:

---

e-government:

---

[4]

[5]
Section B – Answer BOTH Questions

12

The following flowchart shows an algorithm, part of which loops a number of times. The steps of the flowchart have been numbered for ease of referencing.

(a) Study the flowchart and then answer the following questions.

i. What is the process of step 2 called? [1]

ii. How many times steps 3, 4 and 5 are repeated? [2]

iii. What is the value of $N$ after the third repetition of the loop? [2]

iv. Explain briefly what the algorithm does. (No marks are awarded for explaining each flowchart symbol.) [2]

v. Write a program in Pascal for the above flowchart. [6]

(b) To run a Pascal program on a computer, it needs to be converted into machine code. What terms are used for the (i) Pascal program and (ii) machine code version of the program? [2]

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(a) i. Mention two reasons to show the importance of conducting the systems analysis exercise within an organisation. [3]

ii. Why is systems analysis, at times referred to as systems life-cycle? [3]

(b) Feasibility study is carried out at an early stage during systems analysis.

i. Describe one benefit for this. [4]

ii. Name and briefly describe one cost that would be considered. [4]

(c) Name two different methods that the systems analyst may use when investigating the present system. For each method give a reason to show why the analyst may decide on one method and not the other. [4]

(d) Straight changeover and staggered (phased) changeover are two methods that may be employed to change from the old system to the new system.

i. Differentiate between both changeovers. [4]

ii. For each changeover explain when it may be beneficial. [4]