



Annual Examinations for Secondary Schools 2014

FORM 5

COMPUTING

MARKING SCHEME

Section A - Answer all Questions

- 1 (a) Two types of **interfaces** in operating systems are CLI and GUI. What do the acronyms CLI and GUI stand for?
- CLI:** Command Line Interface [1]
- GUI:** Graphical User Interface [1]
- (b) For each situation below name the most suitable operating system: [3]
- i. Payroll system. Batch
 - ii. Aircraft control system. Real Time
 - iii. Banking system. Time-Sharing
- 2 (a) Briefly describe what a **utility software** is.
- Utility Software:** System software designed to help analyze, configure, optimize or maintain a computer [2]
- (b) State which utility software performs the function described below: [3]
- i. This reduces the size of data in order to save space. Compression Software
 - ii. This utility reduces data access time and allows storage to be used more efficiently. Defragmentation
 - iii. This checks your hard disk for errors and corrects problems found. Scandisk
- 3 (a) Why is **secondary storage** required?
- Secondary Storage:** To permanently store data and software [2]
- (b) Name the three types of storage **technology** and for each mention a **medium** used.
- 1st Technology:** Magnetic [½]
- Medium:** Hard disk or relevant [½]
- 2nd Technology:** Optical [½]
- Medium:** CD or relevant [½]
- 3rd Technology:** Electronic [½]
- Medium:** Pendrive or relevant [½]

- 4 The following algorithm is used to generate a **check digit** used for checking credit card numbers. As an example the code is: 1623 7238 9281
- Rules:
- Multiply even positioned numbers from the right by 2:
 $1*2 \ 6 \ 2*2 \ 3 \ 7*2 \ 2 \ 3*2 \ 8 \ 9*2 \ 2 \ 8*2 \ 1$
 - Answer of (i):
 $2 \ 6 \ 4 \ 3 \ 14 \ 2 \ 6 \ 8 \ 18 \ 2 \ 16 \ 1$
 - Add together the digits for those numbers >9:
 $2 \ 6 \ 4 \ 3 \ 1+4 \ 2 \ 6 \ 8 \ 1+8 \ 2 \ 1+6 \ 1$
 - Answer for (iii):
 $2 \ 6 \ 4 \ 3 \ 5 \ 2 \ 6 \ 8 \ 9 \ 2 \ 7 \ 1$
 - Add all numbers together:
 $2+6+4+3+5+2+6+8+9+2+7+1 = 55$
 - The check digit is the remainder when the answer of (v) is divided by 10:
Check digit = $55/10 = 5 \text{ rem } 5$
So check digit is 5 (the remainder)

What is the check digit for the code: 5629 1234 8768?
(Show ALL your working)

Answer: 9 (Allocate 1 mark each from step (ii) to step (vi))

[5]

- 5 Five personnel working in an IT department are: ***I.T. Trainer, Webmaster, Computer Engineer, Systems Designer*** and ***Data Entry Clerk***. Give the main duties for each personnel.

I.T. Trainer: Allocate 1 mark for relevant duties. [1]

Webmaster: Allocate 1 mark for relevant duties. [1]

Computer Engineer: Allocate 1 mark for relevant duties. [1]

Systems Designer: Allocate 1 mark for relevant duties. [1]

Data Entry: Allocate 1 mark for relevant duties. [1]

- 6 The first five steps of Systems Analysis are: 1. Project selection and feasibility study, 2. Present system study and analysis, 3. Design of new computerized system, 4. Programming and documentation and 5. Implementation and changeover methods. Mention one important task which occurs during each step.

Step 1: Allocate 1 mark for relevant task. [1]

Step 2: Allocate 1 mark for relevant task. [1]

Step 3: Allocate 1 mark for relevant task. [1]

Step 4: Allocate 1 mark for relevant task. [1]

Step 5: Allocate 1 mark for relevant task. [1]

- 7 (a) **Define** the terms **LAN**, **MAN** and **WAN**.
- LAN:** Local Area Network is a group of computers and network devices connected together, usually within the same building [1]
- MAN:** Metropolitan area network is a larger network than LAN and usually spans several buildings in the same city or town [1]
- WAN:** Usually not restricted to a geographical area [1]
- (b) E-mail is an application used in WAN. Give another example of a use for WAN and another for LAN.
- WAN:** Allocate 1 mark for relevant example e.g. videoconferencing [1]
- LAN:** Allocate 1 mark for relevant example e.g. sharing files in a lab [1]
- 8 (a) While programming, a programmer might encounter **three** types of programming errors. **Name** the three errors and for each error give an **example** to justify your answer.
- 1st Error:** Syntax error [½]
- Example:** Allocate ½ mark for relevant example [½]
- 2nd Error:** Logic [½]
- Example:** Allocate ½ mark for relevant example [½]
- 3rd Error:** Run-time [½]
- Example:** Allocate ½ mark for relevant example [½]
- (b) Distinguish between **source code** and **executable code**.
- Source:** The code written by a programmer [1]
- Executable:** The translated code which runs (executes) [1]
- 9 (a) Software manufacturers try their best to provide software which cannot be copied. **Name** and briefly **describe** a **hardware** and **software** safeguard.
- Hardware:** Ex. Dongle (or relevant) [½]
- Description:** Allocate ½ mark for relevant description [½]
- Software:** Ex. Serial numbers (or relevant) [½]
- Description:** Allocate ½ mark for relevant description [½]
- (b) What is the main purpose of the **data protection act (DPA)**?
- DPA:** Law which protects how personal data is processed [1]
- (c) Distinguish between **software piracy** and **copyright**.
- Piracy:** Illegal copying of software [1]
- Copyright:** Giving the creator of an original work exclusive rights [1]

10 For each of the following **Input/Output** devices, name the most appropriate application.

Mouse:	<u>Menu selection</u>	[½]
Digital Camera:	<u>DTP</u>	[½]
Dot Matrix Printer:	<u>Invoices</u>	[½]
MICR:	<u>Bank Applications</u>	[½]
Light Pen:	<u>CAD</u>	[½]
Graphics Tablet:	<u>CAD</u>	[½]
Keyboard:	<u>Word processing</u>	[½]
OMR:	<u>Correction of multiple choice questions</u>	[½]
Braille Printer:	<u>Word processing</u>	[½]
Barcode Reader:	<u>POS</u>	[½]

Allocate 1 mark for different relevant application.

11 Study the program below, which is supposed to display a mathematical table from 1 to 12, and then answer the questions:

Line 1	public class MathTable{
Line 2	public static void main(String[] args){
Line 3	int num = 1;
Line 4	System.out.print("Enter which table to calculate: ");
Line 5	int table = Keyboard.readInt();
Line 6	System.out.println();
Line 7	while (num <= 12){
Line 8	System.out.println(_____);
Line 9	num--;
Line 10	}
Line 11	}
Line 12	}

- What is the concept found in line 3 called?
- The program uses one type of iteration, mention another one used in Java.
- As it is the program has an error. In which line number is this error?
- Fix the error found in (iii) so that the program works as intended.
- Fill in Line 8 so that the program displays the answer.

i:	<u>Initialization</u>	[1]
ii:	<u>do-while or for</u>	[1]
iii:	<u>Line 9</u>	[1]
iv:	<u>num++</u>	[1]
v:	<u>num*table</u>	[1]

Section B – Answer BOTH Questions

- 12 (a) The two instructions below form part of an Assembly language program:

LDA B ; Load accumulator A with B
NOT ; Logical NOT the contents of accumulator

- i. From the code above name an **opcode** and an **operand**.
- ii. What would be the value of the accumulator in **decimal** after running the two instructions with **B=50** considering that the accumulator is working in **two's complement**?

- i. **Opcode:** LDA or NOT [1]
Operand: B [1]
-51 (Allocate 1 mark each for:
- converting to 8 bit binary
- NOT
- 2C
- Answer) [4]
- ii. **Accumulator =** _____ [4]

- (b)
 - i. Name **three** registers found in the CPU.
 - ii. Briefly describe the function of each register.

- i. **3 registers:** Accumulator, IR, PC [1]
Accumulator: working area for CPU operations & holds results of calculations
- ii. **1st register:** IR: stores a copy of the instruction that the computer is about to execute [1]
2nd register: _____ [1]
3rd register: PC: hold the address of the next instruction to be executed [1]

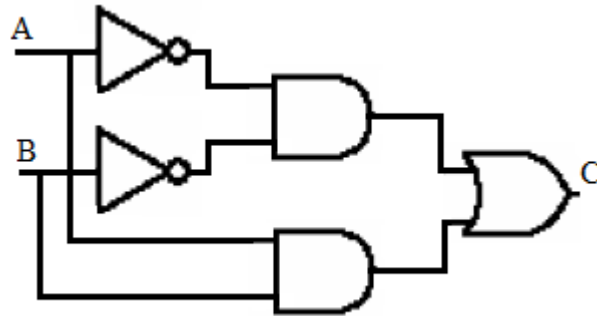
- (c) The process by which a computer retrieves a program instruction from its memory, decodes it and executes it is known as the **fetch execute cycle**. Usually, this cycle is done in six steps. Write the first five steps (the last one is ready).

- Step 1:** Control unit fetches the opcode from the memory location indicated by the Program Counter [1]
- Step 2:** Control unit places opcode in Instruction Register [1]
- Step 3:** Control unit fetches any required operand [1]
Control unit increments the Program Counter to point to the next instruction [1]
- Step 4:** _____ [1]
Control unit activates necessary circuits to execute the instruction [1]
- Step 5:** _____ [1]
- Step 6:** Go back to step 1.

13 (a) Study the truth table and answer the questions below:

A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

- i. Draw the logic circuit which corresponds to the given truth table.
 - ii. Extract the Boolean expression for the circuit.
- i. *Space for logic circuit:*



[5]

ii. **Boolean expression:** $C = (\bar{A}\bar{B}) + (AB)$ [2]

(b) Convert the given numbers to the required number system:

- i. 93_{16} to binary
 - ii. 10101111_2 to decimal
 - iii. 205_{10} to binary
 - iv. 11011010_2 to hexadecimal
 - v. AB_{16} to decimal
 - vi. 195_{10} to hexadecimal
- i. **93** = 10010011 [1]
 - ii. **10101111** = 175 [1]
 - iii. **205** = 11001101 [1]
 - iv. **11011010** = DA [1]
 - v. **AB** = 171 [1]
 - vi. **195** = $C3$ [1]

(c) **Index creation** and **embedded graphic objects** are two features of a DTP. Briefly explain both features.

- i. **Index creation:** *Creating a 'table' with important words and their corresponding page number* [1]
- ii. **Embedded G. O.:** *Technology that allows embedding and linking to documents and other objects* [1]