



امتحان دبلوم التعليم العام

لكلية الحرس السلطاني العماني التقنية (ثنائية اللغة)

الفصل الدراسي الأول - الدور الأول - للعام الدراسي ١٤٤٧/١٤٤٦ هـ - ٢٠٢٤ / ٢٠٢٥ م

تنبيه:
- المادة: دراسات الكمبيوتر.
- الأسئلة في (٧) صفحات.
- زمن الإجابة: ساعتان ونصف.
- الإجابة في الورقة نفسها.

تعليمات مهمة:

- يجب الحضور إلى قاعة الامتحان قبل عشر دقائق على الأقل من بدء زمن الامتحان.
- يجب إحضار أصل ما يثبت الهوية وإبرازها للعاملين بالامتحانات.
- يجب الالتزام بالزي (الدشداشة البيضاء والمصر أو الكمة للذكور) والزي المدرسي للطالبات ، ويستثنى من ذلك الدارسون من غير العمانيين بشرط الالتزام بالذوق العام، ويمنع على جميع المتقدمات ارتداء النقاب داخل المركز وقاعات الامتحان.
- يحظر على الممتحنين اصطحاب الهواتف النقالة وأجهزة النداء الآلي وآلات التصوير والحواسيب الشخصية والساعات الرقمية الذكية والآلات الحاسبة ذات الصفة التخزينية والمجلات والصحف والكتب الدراسية والدفاتر والمذكرات والحقائب اليدوية والآلات الحادة أو الأسلحة أياً كان نوعها وأي شيء له علاقة بالامتحان.
- يجب على الممتحن الامتثال لإجراءات التفتيش داخل المركز طوال أيام الامتحان.
- يجب على الممتحن التأكد من استلام دفتر امتحانه، مغلفاً بغلاف بلاستيكي شفاف وغير ممزق ، وهو مسؤول عنه حتى يسلمه لمراقبي اللجنة بعد الانتهاء من الإجابة.
- يجب الالتزام بضوابط إدارة امتحانات دبلوم التعليم العام وما في مستواه وأية مخالفة لهذه الضوابط تعرضك للتدابير والإجراءات والعقوبات المنصوص عليها بالقرار الوزاري رقم ٥٨٨ / ٢٠١٥.
- يقوم المتقدم بالإجابة عن أسئلة الامتحان المقالية بقلم الحبر (الأزرق أو الأسود).
- يقوم المتقدم بالإجابة عن أسئلة الاختيار من متعدد بتظليل الشكل (▭) وفق النموذج الآتي:

س – عاصمة سلطنة عمان هي:

▭ القاهرة ▭ الدوحة

■ مسقط ▭ أبوظبي

ملاحظة: يتم تظليل الشكل (■) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ■ **غير صحيح** ▭ ◉ ◔ ☒ ☑

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Question One: Multiple Choice (Items 1 – 6) (6 Marks)

Shade in the bubble (⬭) next to the correct answer for each of the following items.

1. Which of the following is a correct example of **application software**?

- ⬭ Linux.
- ⬭ MacOS.
- ⬭ Windows.
- ⬭ Microsoft Word.

2. The result of subtracting the denary number 112 from 300 in **binary** is:

- ⬭ 10111100.
- ⬭ 10110100.
- ⬭ 10011100.
- ⬭ 10011000.

3. Ahmed accidentally clicked on a phishing email link. What is the most immediate step he should take?

- ⬭ Click the link again to verify the threat.
- ⬭ Delete the email and empty the trash bin.
- ⬭ Ignore it and continue using the computer.
- ⬭ Change his passwords and contact his bank.

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Question One Continued

4. The protection method that is primarily used to protect data by making it unreadable without an appropriate key is called:

- ⬭ Firewall.
- ⬭ Encryption.
- ⬭ User ID and password.
- ⬭ Two-factor authentication.

5. Which component of the CPU is responsible for processing calculations and comparing values while the program is being run?

- ⬭ Cache.
- ⬭ Control Unit.
- ⬭ Arithmetic Logic Unit.
- ⬭ Memory Data Register.

6. The **Program Counter (PC)** in a CPU is responsible for:

- ⬭ Pointing to the next instruction.
- ⬭ Executing the instruction.
- ⬭ Decoding the instruction.
- ⬭ Storing the instruction.

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Question Two: Extended Response (Items 7–14) (24 Marks)

Answer ALL questions in the space provided.

7. Complete the below table that compares **RAM** and **ROM**. (3 marks)

	RAM	ROM
Data Retention		
Volatility		
Uses		

8. Complete the sentences with the appropriate answers:

a. In the hexadecimal number system, the values are represented using the **digits** _____ and the **letters** _____ (1 mark)

b. The denary value of the hexadecimal **D** is _____ (1 mark)

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Question Two Continued

9. There are several security threats to data held on a computer or transferred across the networks. One of these risks is Hacking:

a. Define Hacking (1 mark)

b. Identify **ONE** possible effect of hacking on user's data. (1 mark)

c. Your father's computer contains sensitive work-related data. Provide **TWO** recommendations to help him protect his data from hacking and ensure its security. (2 marks)

1.

2.

10. Write the name of the security threat that occurs in each of the following situations:

a. Ali received an email from what appears to be the Shifaa Health App, asking him to click a link to confirm his ID card information or lose access to his account. The email contains spelling mistakes and comes from a suspicious-looking sender address. (1 mark)

b. While connected to public Wi-Fi at a hotel, a guest downloads a free application to watch a movie. Soon after, his laptop slows down significantly, and files start disappearing from his system. (1 mark)

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Question Two Continued

c. Layla received a text message claiming to be from her Health Insurance provider, asking her to click a link to verify her insurance details. The message is from an unknown number and includes a suspicious shortened link. (1 mark)

11. What is the primary function of the **control bus** in a computer system? (1 mark)

12. In brief, explain the **THREE** steps involved in the fetch-decode-execute cycle:

a. Fetch: (1 mark)

b. Decode: (1 mark)

c. Execute: (1 mark)

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Question Two Continued

13. If **A =1110** and **B =1101**

Find **A+B** then **convert** the result to **denary number**.

In your answer, make sure you adhere to the following:

1. Write both binary numbers clearly, aligning them properly for addition.
2. Show the addition process bit by bit, clearly indicating where carrying occurs.
3. Write the resulted value in binary.
4. Show the conversion of the result to the denary clearly.
5. Write the resulted value in denary. (4 marks)

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Question Two Continued

14. A company wants to design a program to determine if each employee is eligible for a performance bonus. The employee **must** meet the two criteria for eligibility which are as follows:

- The employee must have completed at least 2 years of service.
- The employee must have a performance rating of "Good" or "Excellent".

Help the company in designing the program by writing the **program's algorithm** and draw a **flowchart** to illustrate the process flow. (4 marks)

The Algorithm:

The Flowchart:

[End of Examination]

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SULTANATE OF OMAN
MINISTRY OF EDUCATION

Marking Guide of Technical Diploma for Royal Guard of Oman Technical College
2024/2025
Semester One – First Session
Subject: Computer Studies

مركز القياس والتقويم التربوي
The Center for Educational Assessment and Measurement (CEAM)

Note: There are 7 pages in this guide

First: Answers for the Multiple-Choice Items (6 Marks):

Item N.	Answer	Mark	Page Reference	Assessment Objective
1	d. Microsoft Word	1	8	Remembering and understanding
2	a. 10111100	1	14	Application
3	d. Change his passwords and contact his bank.	1	28	Application
4	b. Encryption	1	33	Remembering and understanding
5	c. Arithmetic Logic Unit	1	43	Remembering and understanding
6	a. Pointing to the next instruction	1	44	Remembering and understanding

Second: Answers for the Extended Response Items (24 Marks):

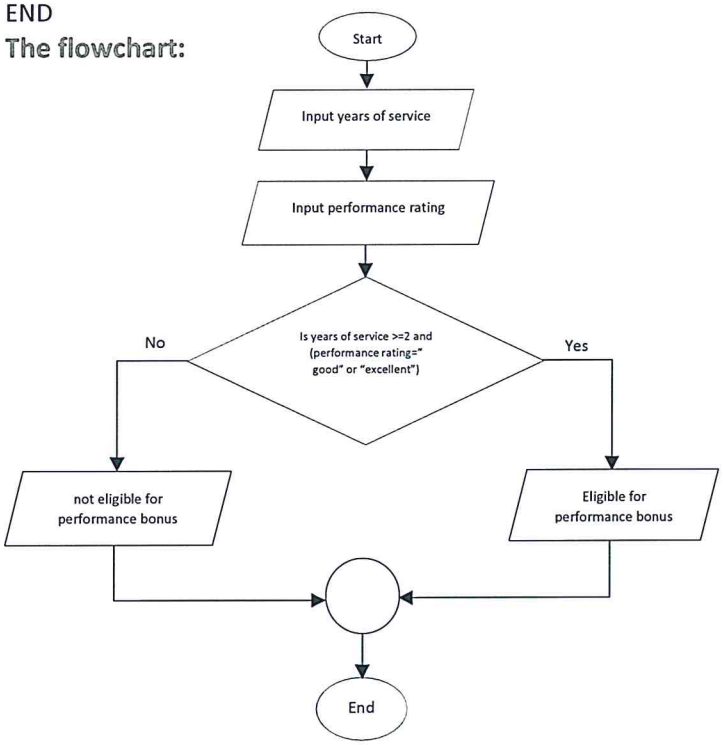
General Notes

- There may be different ways of answering questions, but a basic requirement for all answers is that they are RELEVANT.
- If the answer is clearly not relevant, and the student has clearly made no attempt to answer the question that was set, NO marks should be awarded. However, if the student has genuinely attempted the answer, but his answer is only partly relevant, then a reduced mark (not zero) should be awarded.

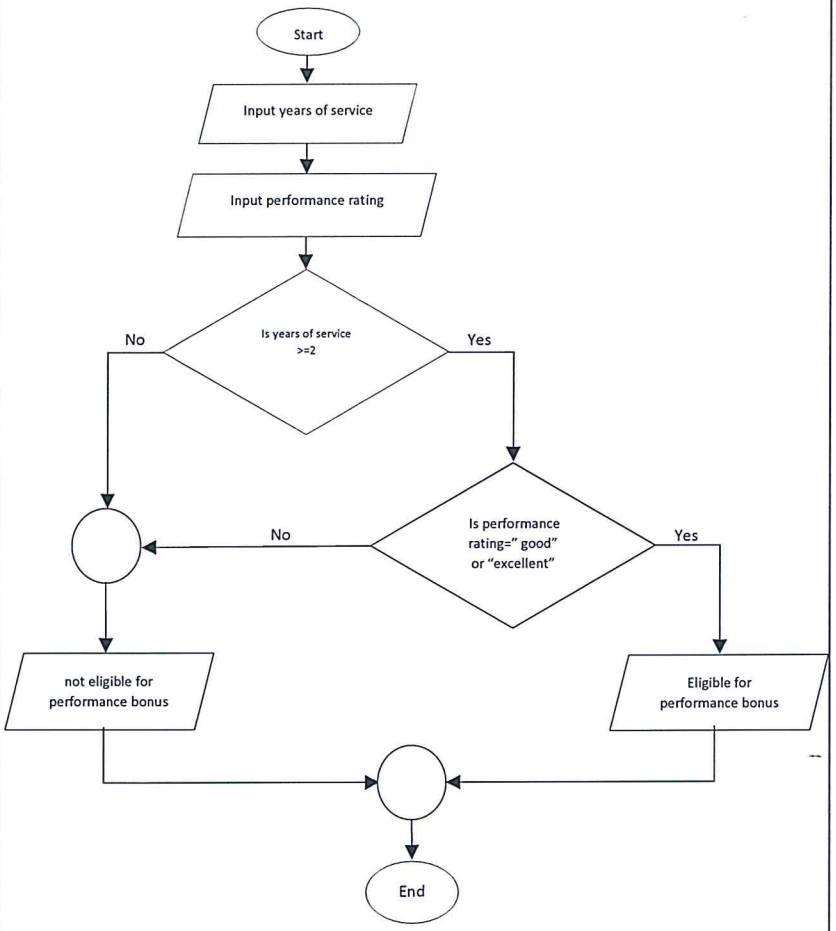
Item N.	Correct Answer	Mark	Page Reference	Assessment Objective
7	<table><tr><th></th><th>RAM</th><th>ROM</th></tr><tr><td>Data Retention</td><td>Temporary Retention</td><td>Permanent Retention</td></tr><tr><td>Volatility</td><td>Volatile</td><td>Non-Volatile</td></tr><tr><td>Uses</td><td>To store data, files, programs, part of the operating system currently in use</td><td>To store Bios and other data needed at start up</td></tr></table> *Each cell is worth 0.5 mark (0.5*6=3 marks)*	3	7	Remembering and understanding
8.a	0-9 or (0,1,2,3,4,5,6,7,8,9) A-F or (A, B, C, D, E, F) *Each blank is worth 0.5 mark (0.5*2=1 mark)*	1	14-15	Remembering and understanding
8.b	13	1	14-15	Remembering and understanding
9.a	Hacking is the act of gaining unauthorized / illegal access to a computer system *Any other correct definition that points to the keywords or its meanings should be awarded.*	1	28	Remembering and understanding
9.b	One possible effect of hacking on a user's data is that sensitive information, such as personal details or financial records, can be stolen and used for identity theft or fraud. *Any other relevant effect should be awarded.*	1	28	Remembering and understanding
9.c	Student's answer may include any two of these recommendations: 1. Install antivirus software: Ensure that antivirus software is installed to detect and remove any malicious software that could be used by hackers to access sensitive data. 2. Use strong passwords: Create strong, complex passwords that include a mix of letters, numbers, and symbols to make it difficult for hackers to guess or crack them. 3. Ensure regular updates: Keep the operating system and software up-to-date to fix any security vulnerabilities that hackers could exploit. 4. Enable a firewall: Use a firewall to monitor incoming and outgoing traffic and block unauthorized access to the computer. *Each correct recommendation is worth 1 mark (1*2=2 marks)* *All other correct relevant recommendations should be awarded and the answer must be related to the problem in the question.*	2	28	Reasoning

10.a	Phishing	1	29-30	Application
10.b	Viruses	1	29-30	Application
10.c	Smishing	1	29-30	Application
11	Control Bus carries signals from the control unit (CU) to all the other computer components. *Any other correct description that points to the keywords or its meanings should be awarded.*	1	46	Remembering and understanding
12	**A sample Answer:** 1. Fetch: The next instruction is fetched from the memory address currently stored in the MAR and the instruction is stored in the MDR. The contents of the MDR are then copied to the Current Instruction Register (CIR). The PC is then incremented (increased by 1) so that the next instruction can then be processed. 2. Decode: The instruction is then decoded so that it can be interpreted in the next part of the cycle. 3. Execute: The CPU passes the decoded instruction as a set of control signals to the appropriate components within the computer system. This allows each instruction to be carried out in its logical sequence *The correct description of each stage is worth 1 mark (1*3=3 marks)* *All other descriptions that are correct should be awarded.*	3	46	Remembering and understanding

13	Step by Step Binary Addition: **Method 1:** Writing the two binary numbers for Addition: 1110 + 1101 Start from the right-most bit: 0+1=1 *(1 mark)* 1+0=1 1+1=0 (Carry 1) 1+1=1 (Carry 1) **The result in binary= 11011** *(1 mark)* *Convert (11011) to denary:* 2^4 2^3 2^2 2^1 2^0 16 8 4 2 1 1 1 0 1 1 *(1 mark)* 16+8+2+1=27 **The result in denary = 27** *(1 mark)* **Method 2:** 0 1 1 1 0 + 0 1 1 0 1 *(1 mark)* 1 1 0 1 1 1 1 (carry) **The result in binary= 11011** *(1 mark)* *Convert (11011) to denary:* 2^4 2^3 2^2 2^1 2^0 16 8 4 2 1 1 1 0 1 1 *(1 mark)* 16+8+2+1=27 **The result in denary = 27** *(1 mark)*	4	14,17-19	Application

14	**The algorithm:** START - Input: read/enter values of "years of service" and "performance rating" - Process: If years of service >= 2 AND performance rating "Good" or "Excellent" - Output: Eligible for performance bonus or not eligible for performance bonus. END **The flowchart:** 	4	53-58	Reasoning

Another Flowchart:



Marking guidance:
2 marks for the algorithm and 2 marks for the flowchart.
Students answers should be mark based on the following rubric:

	0	1	2
Algorithms	The Algorithm is incorrect or does not address the problem's requirements.	The Algorithm is mostly correct but may have minor errors or omissions.	The Algorithm correctly follows the logic of the problem, including all conditions and outputs as specified.
Flowchart	The flowchart does not represent the problem's logic or is incomplete.	The flowchart is mostly correct but may miss some details or have minor inaccuracies.	The flowchart accurately depicts the decision-making process, including all the steps and decisions with the correct flow.

[The End of the Marking Guide]





امتحان دبلوم التعليم العام

لكلية الحرس السلطاني العماني التقنية (ثنائية اللغة)

الفصل الدراسي الأول - الدور الثاني - للعام الدراسي ١٤٤٦ / ١٤٤٧ هـ - ٢٠٢٤ / ٢٠٢٥ م

تنبيه:
- المادة: دراسات الكمبيوتر.
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س – عاصمة سلطنة عمان هي:

○ القاهرة ○ الدوحة

● مسقط ○ أبوظبي

ملاحظة: يتم تظليل الشكل (●) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ● **غير صحيح** ▭ ◉ ◒ ✗ ✓

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Question One: Multiple Choice (Items 1 – 6) (6 Marks)

Shade in the bubble (○) next to the **correct** answer for each of the following items.

1. The computer component that connects the CPU, RAM and all other hardware components is:

- ○ The control unit
- ○ The motherboard
- ○ The microprocessor
- ○ The algorithm and logic unit

2. The result of converting the binary number 101011 into denary is:

- ○ 4
- ○ 43
- ○ 63
- ○ 86

3. The act of gaining unauthorized access to computer system's networks or data is called:

- ○ Pharming
- ○ Phishing
- ○ Hacking
- ○ Virus

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Question One continued

4. When using a public network, the preventive action that helps the user to avoid the unauthorized access to the sensitive data is:

- ☐ Regularly updating the application software.
- ☐ Turn off the firewall and update your software.
- ☐ Ensuring physical security by locking the computer in a cabinet.
- ☐ Using strong, unique passwords and enabling two-factor authentication.

5. The register that contains the address of the next instruction to be executed is the:

- ☐ Current instruction register
- ☐ Memory data register
- ☐ Program counter
- ☐ Accumulator

6. What is the main function of the data bus?

- ☐ It carries data between the CPU, memory, and other devices.
- ☐ It synchronizes the execution of instructions within the CPU.
- ☐ It transmits signals between the CPU and other components.
- ☐ It carries the address of the memory location from the CPU to memory.

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Question Two: Extended Response (Items 7 – 14) (24 Marks)

Write your answer for each of the following questions in the space provided.

7. Identify whether the following software are considered as **application software** or **system software**: (3 marks)

Software	Type of software
Word Processing.	_____
Spreadsheet	_____
Operating System	_____

8. In the **hexadecimal number system**, what digits and letters are used to represent the values? (2 marks)

The digits: _____

The letters: _____

9. List **TWO** tasks of a computer's firewall. (2 marks)

1. _____

_____

2. _____

_____

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Question Two continued

10. Ali creates the following password for his mobile banking account:

"**ali12345**"

but this is considered a weak password.

a. What changes could Ali make to the password to improve its strength? (2 marks)

1. _____

_____

2. _____

_____

b. Suggest a strong password for Ali that follows the best practices for password security. (1 mark)

_____

c. Suppose that a spyware program on your computer has stolen your password. What security measures should you take to protect your account? (2 marks)

1. _____

_____

2. _____

_____

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Question Two continued

11. Complete the following table by identifying the stage of the Fetch-Decode-Execute cycle in which each operation occurs: (2 marks)

The operation	The stage
The CPU passes the instruction as a set of control signals to the appropriate components within the computer system.	
The instruction that is stored in the DMR is copied to the Current Instruction Register (CIR).	

12. Describe how each of the following components affect the CPU processing speed and overall performance:

a. System clock: (1 mark)

b. Cache memory: (1 mark)

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Question Two continued

13. Calculate the result of **adding** the binary numbers **10101** and **10110**, then convert the result to denary.

In your answer, make sure you adhere to the following:

1. Write both binary numbers clearly, aligning them properly for addition.
2. Show the addition process bit by bit, clearly indicating where carrying occurs.
3. Write the resulted value in binary.
4. Show the conversion of the result to the denary clearly.
5. Write the resulted value in denary. (4 marks)

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Question Two continued

14. Draw a flowchart that prompts a user to enter three measurements of an engine torque for a car. Calculate the average of the measurements and compare the calculated average to 250. If the average is greater than 250, display "Torque exceeds the required value" otherwise display "Torque is within the acceptable range". (4 marks)

[End of Examination]

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SULTANATE OF OMAN
MINISTRY OF EDUCATION

Marking Guide of Technical Diploma for Royal Guard of Oman Technical College

2024/2025

Semester One – Second Session

Subject: Computer Studies

مركز القياس والتقويم التربوي
The Center for Educational Assessment and Measurement (CEAM)

Note: There are 7 pages in this guide

First: Answers for the Multiple-Choice Items (6 Marks):

Item N.	Answer	Mark	Page Reference	Assessment Objective
1	b. The Motherboard	1	6	Remembering and understanding
2	b.43	1	14-15	Application
3	c. Hacking	1	28	Remembering and understanding
4	d. Using strong, unique passwords and enabling two-factor authentication	1	35-36	Application
5	c. Program counter	1	44	Remembering and understanding
6	a. It carries data between the CPU, memory, and other devices.	1	45	Remembering and understanding

Second: Answers for the Extended Response Items (24 Marks)

General Notes

- There may be different ways of answering questions, but a basic requirement for all answers is that they are RELEVANT.
- If the answer is clearly not relevant, and the student has clearly made no attempt to answer the question that was set, NO marks should be awarded. However, if the student has genuinely attempted the answer, but his answer is only partly relevant, then a reduced mark (not zero) should be awarded.

Item N.	Correct Answer	Mark	Page Reference	Assessment Objective
7	<table><tr><th>Software</th><th>Type of software</th></tr><tr><td>Word Processing</td><td>Application Software *(1 mark)*</td></tr><tr><td>Spreadsheet</td><td>Application Software *(1 mark)*</td></tr><tr><td>Operating System</td><td>System Software *(1 mark)*</td></tr></table> *Each correct identification is worth 1 mark (1*3=3 marks)*	3	8-10	Remembering and understanding
8	The digits: 0 to 9 *(1 mark)* The letters: A to F *(1 mark)*	2	15	Remembering and understanding
9	Any two of these tasks: • Examine the traffic between user's computer and public network. • Check whether incoming and outgoing data meets a given set of criteria. • Block traffic and give the user a warning for possible security issue. • Log all incoming and outgoing traffic. • Help prevent viruses or hackers entering user's computer. • Send a warning if some software on the system is trying to access external data. *Each correct task is worth 1 mark.* *Any other correct task that is not mention above should be awarded.*	2	34	Remembering and understanding
10.a	Any two of these: • Add at least one capital letter. • Include at least one keyboard character (@ # $ % &) • Avoid common words (avoid using his name) • Use an unexpected pattern (like "12345") *Each correct answer is worth 1 mark.* *Any other correct answers should be awarded.*	2	36	Application

<table>
<tr><td>10.b</td><td>Any password that includes:
1. Uppercase and lowercase letters
2. At least one numerical value.
3. At least one other keyboard character (such as @,*, & etc.)
4. The length should be at least 8 characters.</td><td>1</td><td>36</td><td>Application</td></tr>
<tr><td>10.c</td><td>Any two of these actions:

1. Run anti-spyware software to make sure that your password is not being relayed back to anyone who put the spyware on your computer
2. Change passwords on a regular basis.
3. Enable two-factor authentication

Any other correct relevant recommendation should be awarded.</td><td>2</td><td>36</td><td>Reasoning</td></tr>
<tr><td>11</td><td><table><tr><th>The operation</th><th>The stage</th></tr><tr><td>The CPU passes the instruction as a set of control signals to the appropriate components within the computer system.</td><td>Execute (1 mark)</td></tr><tr><td>The instruction that is stored in the DMR is copied to the Current Instruction Register (CIR).</td><td>Fetch (1 mark)</td></tr></table></td><td>2</td><td>46</td><td>Remembering and understanding</td></tr>
<tr><td>12.a</td><td>When the clock speed increases, the processing speed of the computer is also increased.</td><td>1</td><td>48</td><td>Remembering and understanding</td></tr>
<tr><td>12.b</td><td>The larger the cache memory size the better the CPU performance.</td><td>1</td><td>48</td><td>Remembering and understanding</td></tr>
</table>

13	**Step-by-step Binary Addition:** Writing the two binary numbers for Addition: *(0.5 mark)* 10101 + 10110 Start from the right-most bit: 1+0= 1 0+1=1 1+1=0 with a carry of 1 *(1 mark)* 1+0=1 1+1=0 with a carry of 1 **The result in binary=** 101011 *(1 mark)* *Convert (101011) to denary:* 2^5 32 | 2^4 16 | 2^3 8 | 2^2 4 | 2^1 2 | 2^0 1 1 | 0 | 1 | 0 | 1 | 1 *(1 mark)* 32+8+2+1=43 **The result in denary = 43** *(1 mark)*	4	17	Application

Method 2:

	0	1	0	1	0	1	
+							
	0	1	0	1	1	0	
	1	0	1	0	1	1	*(1 mark)*
	1		1				(carry)

The result in binary= 101011 *(1 mark)*

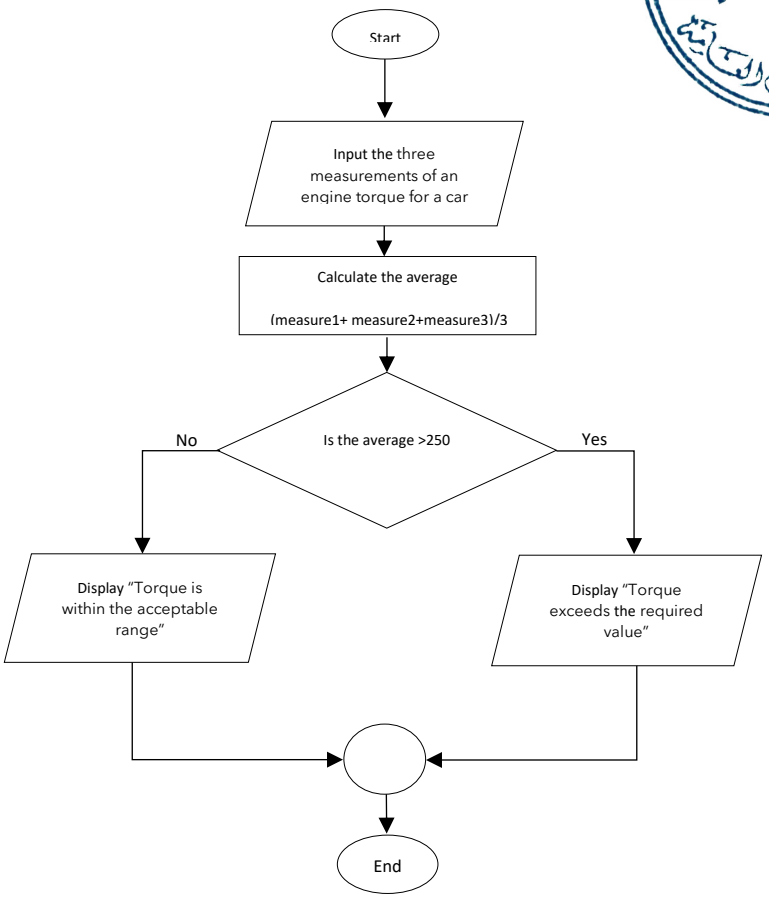
Convert (101011) to denary:

2^5	2^4	2^3	2^2	2^1	2^0	
32	16	8	4	2	1	*(1 mark)*
1	0	1	0	1	1	

32+8+2+1=43

The result in denary = 43 *(1 mark)*

The flowchart:



14	4	54	Reasoning	

Marking guidance:
Students answers should be mark based on the following rubric:

	0	1	2	3	4
Flowchart	The flowchart does not represent the problem's logic.	The flowchart is incomplete. Or, it has 4 or more errors	The flowchart is mostly correct, but it has 2 or more errors.	The flowchart is mostly correct, but it has 1 error.	The flowchart accurately depicts the decision-making process, including all the steps and decisions with the correct flow.

[The End of the Marking Guide]