SECOND SEMESTER

ICT

(تقنية المعلومات والاتصالات)

(Questions)



سلطنة عمان
وزارة التربية والتعليم



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

امتحان دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)

للعام الدراسي ١٤٤٦/١٤٤٥ هـ - ٢٠٢٣ / ٢٠٢٤ م

الفصل الدراسي الثاني - الدور الأول

تنبيه:
- المادة: تقنية المعلومات والاتصالات.
- الأسئلة في (١١) صفحة.
- زمن الإجابة: ثلاث ساعات.
- 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** ⊖ ◉ ◔ ⊗ ✓

مُسَوَّدَة، لا يتم تصحيحها

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Question One: Multiple Choice (Items 1 – 8) (8 marks)

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

1. The phase of the system life cycle that involves understanding the operations of the current system and determining the client's requirements for the new system is called:

- ⬭ Analysis
- ⬭ Design
- ⬭ Implementation
- ⬭ Evaluation

2. Which validation rule would be most essential for ensuring accurate entry in a form for collecting users' addresses?

- ⬭ City/town must be a two-letter abbreviation.
- ⬭ The Address must contain exactly 50 characters.
- ⬭ The Country name must start with a capital letter.
- ⬭ Postal/ZIP code must match the country selected.

3. In software development, what specifically characterizes **white box testing**?

- ⬭ Testing internal structure and logic of a software application.
- ⬭ Not involving testing the functionality of a software application.
- ⬭ Testing software functionalities without considering the internal structure or code.
- ⬭ Requiring testers to have knowledge of the user interface design of the software application.

4. Ali is experiencing difficulties connecting his wireless printer to his home network. Which section of the user documentation would likely provide step-by-step guidance to resolve this issue?

- ⬭ Troubleshooting section.
- ⬭ System requirements.
- ⬭ Instructions section.
- ⬭ Installation guide.

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Question One Continued

5. "Prioritizing the rapid development of the model to illustrate its core functionalities and design". This represents a core characteristic of:

- ▢ Feasibility prototyping.
- ▢ Throwaway prototyping.
- ▢ Incremental prototyping.
- ▢ Evolutionary prototyping.

6. A graphic designer is creating a portfolio to showcase his artwork and design projects. Which of the following **file formats** would be most suitable for the portfolio, allowing the designer to keep the document as it was designed while ensuring compatibility across different devices and platforms?

- ▢ .JPEG
- ▢ .PNG
- ▢ .PDF
- ▢ .SVG

7. Which of the following best defines **opacity** in graphic design?

- ▢ The property that determines the visibility or transparency of an image or object.
- ▢ The degree to which an object's surface reflects or absorbs light.
- ▢ The extent to which an object's surface appears shiny or dull.
- ▢ The measure of the brightness or darkness of a color.

8. **Lossy compression** is a compression method that:

- ▢ Does not remove any data but affects the quality.
- ▢ Retains all the original image data while reducing the file size.
- ▢ Permanently discards certain image data, with no effect on quality.
- ▢ Removes non-essential image data to reduce file size, resulting in some loss of quality.

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Question Two: Extended Response (Items 9–17) (32 marks)

Answer ALL questions in the space provided.

9. In the design stage, diagrams and charts can be used to illustrate the overall structure of the system.

a. What is the primary function of a system flowchart? (1 mark)

b. Draw the symbol that represents each of the following flowchart's elements:

(2 marks)

Process	
Manual Input	
Document	
Multi-Document	

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Question Two Continued

10. When a system is developed, it is necessary to test the input data using validation rules.

a. Describe **TWO** elements that can be found in a test plan. (2 marks)

b. Write **ONE** value that corresponds to each type of test data in the following table: (1 mark)

Type of test data	The inputs data of the system are the amounts of salary between 500 OMR to 2000 OMR.
Valid	_____ (OMR)
Invalid	3000 (OMR)
Extreme	_____ (OMR)

11. **Provide ONE** specific situation in which user documentation is needed, and briefly **describe** the specific section in the documentation that is required in the situation you provided. (2 marks)

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Question Two Continued

12. Describe what is meant by the term "**layer**" in graphic design. (1 mark)

13. Compression is a mechanism to reduce the file size on an image. There are two types of compression, lossless and lossy.

a. Identify **TWO** examples of **lossy compression**. (1 mark)

b. Provide a real-life situation where lossy compression is commonly applied. (2 marks)

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Question Two Continued

14. A hospital is seeking to implement a new computer system to track patient records, medical histories, appointments, billing information, and other essential aspects of hospital operations. Given the critical nature of these records and the sensitive financial data involved, any errors in the implementation process could lead to significant losses of patient records and financial data.
Which **implementation method** would be best suited for the hospital: pilot implementation or direct changeover?

In your answer, you should include the following:

a. The definition of both **pilot implementation** and **direct changeover** methods.

b. A recommendation of the most appropriate implementation method for the hospital.

c. A justification of the choice by dicussing **ONE** relevant factor that needs to be considered when selecting the best implementation method and how it affects the choice.

Remember: Link your answer to the provided context of the hospital. (5 marks)

(a)

(b)

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Question Two Continued

(c)

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Question Two Continued

15. A startup logistics company has recently implemented a new system using pilot implementation, which was evaluated through questionnaires distributed to the staff and through the observation of the shift process. Based on the observation and the feedback received, the staff found no issues with the system and deemed it satisfactory. However, the company has decided to expand its operations to include the control, planning, and implementation of services movement, not just goods.

a. Describe another **method of evaluation** that could be used to assess the effectiveness of the system in this new context and how it could be used.

b. **Recommend** the best method for maintaining and adapting the system as the company expands its operations. Justify your answer.

Remember: there are four methods of maintenance: **Perfective, Adaptive, Preventive**, and **Corrective**. (5 marks)

(a)

(b)

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Question Two Continued

16. Image editing plays a significant role in modern media and digital communication, offering a range of tools to manipulate and enhance visual content.

a. Identify any **TWO** tools commonly used in image editing software.

b. Discuss **ONE** problem associated with image manipulation in any context of your choice (e.g., social media, advertising, or journalism).

c. Describe **ONE** consequence resulting from the identified problem.

Remember: make your discussion relevant to the context you choose. (4 marks)

(a)

(b)

(c)

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Question Two Continued

17. Read the following scenario carefully, then answer all the questions in the space provided:

A banking company recognizes the need to improve its mobile banking system for better user experience and enhanced security. To achieve this, they employed a questionnaire research method to gather insights from customers. A project team was formed, comprising various stakeholders such as business analysts, developers, testers, and project managers. System architects then designed the system's architecture, including database structure, user interface, and system components.

A detailed prototype was submitted to the developers. The Developers proceeded to code the system based on the approved prototype. Subsequently, a comprehensive testing plan was implemented to identify and address any issues. The bank now is working on the corrective maintenance to fix any technical issues and bugs before the final adoption of the system.

a. State **ONE** advantage and **ONE** disadvantage of the **questionnaire research method** that was used by the bank. (1 mark)

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Question Two Continued

b. Discuss **ONE** consequence of the advantage and **ONE** consequence of the disadvantage you identified in the previous question.
Remember: Link your answer to the provided context. (4 marks)

c. As mentioned in the scenario, the design team has submitted a detailed prototype to the developers. Describe what is meant by **a prototype**. (1 mark)

[End of Examination]

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The Center for Educational Assessment and Measurement (CEAM)

امتحان دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)

للعام الدراسي ١٤٤٦/١٤٤٥ هـ - ٢٠٢٤/٢٠٢٣ م

الفصل الدراسي الثاني- الدور الثاني

تنبيه:
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س – عاصمة سلطنة عمان هي:

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■ 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 – 8) (8 marks)

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

1) Which of the following implementation methods involves replacing the old system with a new system, resulting in an immediate and complete transition?

- ⬭ Parallel running.
- ⬭ Direct changeover.
- ⬭ Pilot implementation.
- ⬭ Phased implementation.

2) A school implemented a new email system gradually, starting with one department and then extending to others. Which implementation method did the school use?

- ⬭ Phased implementation.
- ⬭ Pilot implementation.
- ⬭ Direct changeover.
- ⬭ Parallel running.

3) Which statement accurately describes the primary objective of **user documentation** within a software or system development?

- ⬭ It outlines the legal terms and conditions governing software usage.
- ⬭ It documents the source code for future reference and maintenance.
- ⬭ It assists users in software installation, operation, and troubleshooting.
- ⬭ It aims to showcase the software's features and attract potential users.

4) The prototyping method that involves creating a basic version of the system, then gradually refining it through successive iterations based on feedback, is known as:

- ⬭ Evolutionary prototyping.
- ⬭ Incremental prototyping.
- ⬭ Throwaway/rapid prototyping.
- ⬭ Concurrent prototyping.

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Question One Continued

5) A team wants to build a basic prototype to gather user feedback without investing much time in refining it. What prototyping approach are they likely to use?

- ☐ Hybrid
- ☐ Incremental
- ☐ Evolutionary
- ☐ Throwaway/rapid

6) Hue in HSL color system refers to the:

- ☐ shade of a color.
- ☐ saturation of a color.
- ☐ brightness of a color.
- ☐ base color of the object.

7) A gamer has bought a new monitor and noticed that the colors seem a bit off. He decides to explore the settings menu to adjust the display. Which color system is employed to produce the wide range of colors as seen on the screen?

- ☐ CMYK
- ☐ RGB
- ☐ HSL
- ☐ CMS

8) Which of the following defines color depth in digital imaging?

- ☐ The intensity of the primary colors used to create an image.
- ☐ The ratio of luminance to chrominance in a digital color space.
- ☐ The number of colors that can be displayed per pixel in an image.
- ☐ The measure of the range of hues available in a given color system.

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Question Two: Extended Response (Items 9–18) (32 marks)

Answer ALL questions in the space provided.

9) Describe **TWO** key elements in a data flow diagram (DFD). (2 marks)

(1) _____

_____

(2) _____

_____

10) State **TWO** elements that can be found in a system flowchart. (2 marks)

(1) _____

(2) _____

11) Provide **ONE** example of each of the following:

a. User documentation (1mark)

_____

_____

_____

b. Technical documentation (1mark)

_____

_____

_____

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Question Two Continued

12) The school recently implemented a new software to track the amount of food waste being composted and provide insights into the composting program's effectiveness. As a member of the student council, you have been tasked with evaluating the success of this software.
Briefly, explain **TWO** elements you would evaluate to assess the effectiveness of this monitoring software. (2 marks)

(1) _____

_____

(2) _____

_____

13) Define the following color systems:

a. CMYK (1 mark)

_____

_____

_____

b. CMS (1 mark)

_____

_____

_____

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Question Two Continued

14) There are two types of compression: Lossy and Lossless.
In the following table, determine which situation requires lossy compression and which requires lossless compression:

(2 marks)

The situation	The compression method
a. There is a collection of family photos to be archived on a computer. The goal is to ensure that every detail in the images, such as colors and clarity, is preserved exactly as it is in the original photos.	_____
b. A photographer wants to create a website to show his work and upload a series of high-resolution images. The aim is to reduce the file size of the images to improve website loading times.	_____

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Question Two continued

15) In a tech company, a team is creating a new mobile application for remote workers. They recognize the need to understand user preferences and requirements to ensure the application's effectiveness. To gather insights from workers, they will use either the **Questionnaire** research method or the **Interview** research method. Choose one method and answer the following questions.

In your answer, you should include the following:

(a) The definition of the method.

(b) The discussion of **ONE** advantage and **ONE** disadvantage of the chosen method.

Remember: Link your answer to the provided context.

(6 marks)

The definition:

The discussion of the advantage:

The discussion of the disadvantage:

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Question Two continued

16) In software development, a clear understanding of testing data types is important, as the categorization of these types significantly influences system evaluation and reliability.
There are four types of testing data as shown in the table below, distinguish between them in terms of their definitions. (4 marks)

The Type	Definition
Valid	
Invalid	
Extreme	
Live Data	

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Question Two continued

17) In today's visually-driven world, image editing tools have transformed how we view and engage with visual content. However, this surge in digital manipulation poses significant challenges.
Discuss **ONE** issue associated with image editing in society.

In your answer, you should include:

(a) The meaning of image editing.

(b) A discussion of **ONE** issue associated with image editing in society and **ONE** impact of this issue.

(c) A real-world example to illustrate your point. And make sure you link the example to the discussion.

(4 marks)

The meaning:

The discussion of the issue and the impact:

The example:

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Do not write in this space

Do not write in this space

Question Two continued

18) Read the following Scenario, then answer all questions in the space provided:

An updated Student Information System (SIS) is essential for schools as it serves as the backbone of the administrative processes. By providing real-time access to accurate student data, it enables personalized learning experiences, streamlines administrative tasks, and fosters efficient communication among stakeholders. In today's digital age, an updated SIS is important for schools to meet the diverse needs of students, parents, and educators while enhancing operational efficiency.

In the context of a high school, where everything needs to run smoothly, the school's IT coordinators find themselves facing a big challenge. The current SIS is slow and prone to errors. It makes lots of mistakes. Because of this, teachers struggle to keep track of things like grades and attendance, and it's hard for them to talk to parents too. This makes teachers feel really frustrated, and they want a system that's much better.

Consequently, the IT coordinators at the school want to upgrade its student information system to better track grades, attendance, and parent communication. The school is eager to improve efficiency and communication.

a. Demonstrate which implementation method would be the most appropriate for introducing the new student information system at the high school. Justify your choice. (2 marks)

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Question Two continued

b. **Suggest** and **discuss** the best maintenance type to ensure the smooth operation and long-term viability of the new student information system. Consider factors such as adapting to evolving user needs, and optimizing system performance. (4 marks)

[End of Examination]

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SECOND SEMESTER

ICT

(تقنية المعلومات والاتصالات)

(Answers)

SULTANATE OF OMAN
MINISTRY OF EDUCATION

Marking Guide of General Educational Diploma for Private Schools
2023/2024
Semester TWO – First Session
Subject: ICT

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

Note: There are 12 pages in this guide

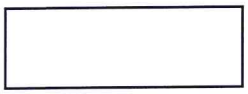
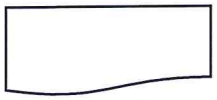
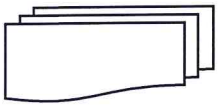
First: Answers for the Multiple-Choice Items (8 Marks):

N.	Answer	Mark	Learning Outcome	Learning Level
1	A Analysis	1	Define the term analysis	AO1
2	D Postal/ZIP code must match the country selected.	1	Explain and apply validation routines.	AO2
3	A Testing internal structure and logic of a software application.	1	Define the terms black box testing and white box testing.	AO1
4	A Troubleshooting section	1	Explain why technical and user documentation are needed	AO2
5	B Throwaway prototyping	1	Explain different types of prototyping and explain why each is needed	AO1
6	C .PDF	1	Identify different file formats (SVG,BMP, GIF, JPEG, PNG,TIFF,PDF) and image types (Bitmap, Vector)	AO2
7	A The property that determines the visibility or transparency of an image or object.	1	Define opacity and transparency	AO1
8	D removes non-essential image data to reduce file size, resulting in some loss of quality.	1	Describe lossless and lossy compression	AO1

Second: Answers for the Extended Response Items (32 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.

<table>
<tr><th>N.</th><th>Correct Answer</th><th>Mark</th></tr>
<tr><td>9.a</td><td>
A sample Answer:
It shows the flow of data and processes within a complete system.
Marking Guidance and Rubric:
The provided answer is just a sample answer, all other answers should be marked based on the following rubric:
<table>
<tr><th>Mark</th><th>Knowledge and Understanding
(AO1) - 1 mark</th></tr>
<tr><td>1</td><td>The answer demonstrates a clear understanding of the primary rule of system flowcharts.</td></tr>
<tr><td>0.5</td><td>The answer provides a partially accurate or incomplete statement of the primary rule of system flowcharts.</td></tr>
<tr><td>0</td><td>The answer does not demonstrate an understanding of the rule of system flowcharts or is completely incorrect.</td></tr>
</table>
<table>
<tr><td>Learning Outcome</td><td>Identify the elements, purposes, and symbols of flowcharts.</td></tr>
<tr><td>Learning Level</td><td>AO1</td></tr>
<tr><td>Pages</td><td>S1. 350</td></tr>
</table>
</td><td>1</td></tr>
<tr><td>9.b</td><td>
Answer:
<table>
<tr><td>Process</td><td></td></tr>
<tr><td>Manual Input</td><td></td></tr>
<tr><td>Document</td><td></td></tr>
<tr><td>Multi-Document</td><td></td></tr>
</table>
Marking Guidance:
Each correct symbol worth 0.5 mark (4*0.5=2 marks)
<table>
<tr><td>Learning Outcome</td><td>Identify the elements, purposes, and symbols of flowcharts.</td></tr>
<tr><td>Learning Level</td><td>AO2</td></tr>
<tr><td>Pages</td><td>S1. 350 - 351</td></tr>
</table>
</td><td>2</td></tr>
</table>

10.a — 2

A sample answer:

There are multiple elements included in the test plan, two of them are:

- All the users' requirements.
- The different types of test data (valid (normal), invalid (abnormal), and extreme).
- Every input, every button, every link, every report, every screen and all other elements of a system.

Marking Guidance and rubric:

*Each correct element worth 1 mark (2*1=2 marks)*

The provided answer is just a sample answer; all other answers should be marked based on the following rubric:

Mark	Knowledge and Understanding (AO1) - 2 marks
2	The answer provides two basic elements included in a test plan.
1	The answer provides one correct element included in a test plan.
0	No Answer provided or the answer is incorrect or irrelevant to the question.

Learning Outcome	Describe the importance of testing and having a test plan
Learning Level	AO1
Pages	S1. 358

10.b — 1

Answer:

Valid	505 (OMR)
Invalid	3000 (OMR)
Extreme	500, ***or*** 2000 (OMR)

Marking Guidance:

In valid type: any figure between 500 and 2000 is correct (0.5 mark)

In Extreme: The mentioned figures are the only accepted figures. Mentioning one of the two figures means the student got (0.5 mark).

Learning Outcome	Explain the types of testing (Valid, Invalid, Extreme, and live data)
Learning Level	AO2
Pages	S1. 356

11 — 2

A sample Answer:

Example: A novice user who has recently purchased a new digital camera or any electronic device may find themselves in need of user documentation to understand how to operate the device effectively. Specifically, when attempting to capture high-quality photographs in low-light conditions.

The user may refer to the "Instruction Manual" section in the user manual. This section provides detailed step-by-step instructions on adjusting ISO settings, selecting appropriate aperture and shutter speed settings, and utilizing features such as image stabilization or low-light shooting modes.

Other sections: user guide, content page which has a hyperlink, a glossary page, troubleshooting guide and instruction manual.

Marking Rubric and Guidance:

The provided answer is just a sample answer, any other correct answer should be marked based on the following rubric:

Mark	Knowledge and Understanding (AO1) 1 mark	Mark	Application (AO2) 1 mark
1	Accurate identification and brief description of the specific section required for the example provided.	1	The provided example is clear and relevant
0.5	Correct identification with no description of the section.	0.5	The provided example lacks clarity or relevance.
0	No section identified or incorrect section identified.	0	No example provided.

Learning Outcome	Explain why technical and user documentation is needed
Learning Level	AO1, AO2
Pages	S1. 364

12 — 1

A sample answer:

The layer is **a 'surface'** onto which **an image or object is placed**.

Marking Guidance and rubric:

The provided answer is just a sample answer, any other correct answer should be marked based on the following rubric.

Mark	Remembering and understanding (AO1) -1 mark
1	Accurate description is provided.
0.5	Partial or somewhat accurate description is provided.
0	No description is provided, or the provided description is incorrect.

Learning Outcome	Define the term layer.
Learning Level	AO1
Pages	S1. 401

13.a — 1

Answer:

The two examples of lossy compression are:

Changing the color depth.

Changing the resolution.

Marking Guidance and rubric:

The provided answer is just a sample answer, any other correct answer should be marked based on the following rubric.

Mark	Remembering and understanding (AO1)- 1 mark
1	Two correct relevant examples of lossy compression are provided
0.5	Only one correct relevant example of lossy compression is provided
0	No examples of lossy compression are provided, or incorrect examples are provided

Learning Outcome	Describe lossless and lossy compression
Learning Level	AO1
Pages	S1. 420

13.b — 2

A sample Answer:

An example of lossy compression in practice is the compression of images for web usage, live streaming media, multimedia (audio, video, image) and presentation. In this scenario, image files are compressed using techniques like quantization and subsampling to reduce their size while maintaining an acceptable level of visual quality. This allows websites to load images more quickly, improving user experience without significantly compromising image clarity.

Marking Guidance and rubric:

The provided answer is just a sample answer, any other correct answer should be marked based on the following rubric.

Mark	Application (AO2) - 2 marks
2	An accurate and relevant example in which lossy compression is used is provided
1	A partial accurate example in which lossy compression is used is provided but it lacks clarity or relevance.
0	No real-world example in which lossy compression is used is provided.

Learning Outcome	Describe lossless and lossy compression
Learning Level	AO2
Pages	S1. 420

14	A sample answer: (a) Pilot implementation: Pilot implementation takes place when part of an organization starts to use the new system while the rest of the organization continues to use the old system. The new system is effectively being beta tested by the pilot group. Direct changeover: Direct changeover is when a date is chosen for the old system to stop running and the new system to start running. The systems do not run at the same time and there is a clear break from the old system to the new system. Data will need to be transferred from the old system to the new system before the new system can be used. (b) Considering the critical nature of patient records and financial data in the hospital, the most appropriate implementation method would be the **pilot implementation** or **parallel implementation**. (c) One relevant factor to consider when selecting the best implementation method for this hospital is the criticality of the system to the running of the organization. The patient records, medical histories, appointments, and billing information managed by the new system are crucial for the hospital's daily operations and the delivery of quality patient care. Any errors or disruptions in accessing or managing this information could have serious implications for patient safety, treatment outcomes, and financial stability. Pilot implementation offers a more controlled and phased approach to introducing the new system, allowing the hospital to prioritize patient care while minimizing risks. By initially implementing the system in a limited scope or specific departments, the hospital can ensure that essential functions are not compromised during the transition period. This approach allows for thorough testing, training, and adjustment based on feedback from staff and patients, reducing the likelihood of errors or disruptions that could impact the hospital's ability to deliver critical services. Other factors: cost, number of users and size of the new system.	5

Marking Guidance and rubric:

The provided answer is just a sample answer, any other correct answer should be marked based on the following rubric

Mark	Knowledge and Understanding (AO1) - 2 marks	Mark	Analysis (AO3) - 1 mark	Mark	Evaluation (AO4) - 2 marks
2	Accurate clear definitions of both pilot and changeover are provided.	1	A reasonable relevant recommended method is provided	2	Detailed analysis of one relevant factor with clear insights into their implications for the selected implementation method in the provided context
1.5	An accurate clear definition of one of the methods and a partial or somewhat imprecise definition of the second method.	0	No recommendation provided.	1-1.5	A basic justification of the selected method by analyzing one factor and how it shaped the decision. However, the analysis lacks depth and insight or does not provide any link to the context or the link unclear.
1	Partial definitions of the two implementation methods are provided. But the definitions lack detail or precision. Or an accurate definition of one of the methods but not both.			0.5	Limited imprecise and non-concise justification with no analysis of the factor in the provided context. The justification is of minimal depth or relevance.
0.5	A partial definition of one of the two implementation methods is provided but not both. The definition is lacking detail or precision.			0	No Justification and no analysis of factors is provided.
0	No definitions of both pilot and changeover are provided, or the provided definition is incorrect or irrelevant.				

Learning Outcome	Evaluate the factors to choose the suitable implementation method. Differentiate between the methods of implementation
Learning Level	AO1, AO2, AO3, AO4
Pages	S1. 360-361

15

A sample answer:

(a) An additional method of evaluation that could be used to assess the effectiveness of the system in the context of services movement is conducting interviews with key stakeholders. Interviews allow the company to gather in-depth qualitative feedback from individuals involved in the planning, control, and implementation of the service movement. By interviewing managers, supervisors, and frontline staff responsible for service management, the company can gain valuable insights into their experiences with the system, any challenges they encounter, and suggestions for improvement.

(b) The best method for maintaining and improving the system as the company expands its operations to include services movement is adaptive maintenance. Adaptive maintenance involves modifying the system to accommodate changes in the company's business environment or requirements. As the company transitions from handling goods to also managing services movement, there will be new challenges and requirements that the system needs to address. Adaptive maintenance allows the company to make necessary modifications to the system, such as adding new features or functionalities to support service planning, scheduling, and tracking. This ensures that the system remains aligned with the company's evolving needs and effectively supports its expanded operations.

Marking rubric and guidance:

The provided answer is just a sample answer; all other answers should be marked based on the following rubric:

5

Mark	Application (AO2) – 2 marks	Mark	Evaluation (AO4) – 3 marks
2	A relevant and specific method of evaluation is described, demonstrating understanding of the company's operations.	3	A recommendation is provided with clear justification and specificity, demonstrating an understanding of the recommended method of maintenance and its implications for the company's expanded operations.
1	A method of evaluation is described, but it lacks specificity or relevance to the company's context.	2	A recommendation is provided with some justification but lacks depth.
0	No method of evaluation described, or irrelevant method mentioned.	1	A recommendation is provided, but it lacks justification or specificity.
		0	No recommendation provided.

Learning Outcome	Explain perfective maintenance, adaptive maintenance, preventive maintenance, and corrective maintenance with an example.
Learning Level	AO2, AO4
Pages	S1. 365-p366

16	A sample Answer: **(a)** Two specific tools commonly used in image editing software are the "Clone Stamp Tool" and the "Red Eye Tool". Other tools: Selection tools (lasso, magic, wand, shape), filters include (clone, red eye, blur, sharpen, smudge) **(b)** One problem associated with Image manipulation in the context of advertising is the unrealistic portrayal of beauty standards. In advertising, images are often heavily edited to enhance the appearance of models and products, leading to unrealistic expectations and perceptions of beauty. For example, a cosmetic advertisement may digitally alter a model's features to create flawless skin or exaggerated body proportions, presenting an idealized version of beauty that is unattainable. **(c)** The consequence of this problem is the negative impact on self-esteem and body image. When individuals are repeatedly exposed to digitally manipulated images that promote unrealistic beauty standards, they may develop feelings of inadequacy or dissatisfaction with their own appearance. This can contribute to body image issues, low self-esteem, and mental health problems, such as depression and eating disorders. Additionally, the perpetuation of unrealistic beauty ideals in advertising can perpetuate harmful stereotypes and contribute to the marginalization of individuals who do not fit these narrow standards of beauty. Marking Guidance and Rubric: The provided answer is just a sample answer, all other answers should be marked based on the following rubric:	4

Mark	Knowledge and Understanding (AO1) 1 mark	Mark	Application (AO2) 1 mark	Mark	Analysis (AO3) 2 marks
1	Two correct tools identified.	1	The discussion is highly relevant to the chosen context, providing a clear insights and connections.	2	A problem associated with image manipulation is discussed, providing clear insights into its implications, and the consequence is clearly described.
0.5	One correct tool identified.	0.5	The discussion is somewhat relevant to the chosen context but lacks specificity.	1	A problem associated with image manipulation is discussed, but lacks depth or clarity in its explanation, and/or the consequence is not clearly described.

	0	No tools identified or the identified tools are incorrect or irrelevant.	0	The discussion of the problem and its consequence is not relevant to the chosen context, or the context is not clearly specified. Or no discussion provided.	0	No problem associated with image manipulation, or its consequence discussed.

Learning Outcome	Explain the tools of image editing software. Explain the problems associated with image manipulation in society.
Learning Level	AO1, AO2, AO3
Pages	S1. 418

17.a

A sample Answer:

An advantage of using questionnaires is their cost-effectiveness and efficiency in collecting data from a large number of stakeholders within a short timeframe.

A disadvantage is that questionnaires may suffer from low response rates.

Marking Guidance and Rubric:

The provided answer is just a sample answer, all other answers should be marked based on the following rubric:

Mark	Remembering and Understanding AO1 - 1 mark
1	Accurate relevant response identifying both an advantage and a disadvantage of questionnaire method.
0.5	A partial response was provided, identifying one advantage or one disadvantage but not both.
0	No response provided, or the provided response is irrelevant.

Learning Outcome	Analyze the advantages and disadvantages of each analysis method
Learning Level	AO1
Pages	S1. 344-p345

1

17.b

A sample Answer:

One consequence of the advantage of cost-effectiveness in using questionnaires to gather requirements for the online banking system is that it allows the banking company to allocate resources more efficiently, potentially saving time and money in the research process. This could mean that the company can invest additional resources in other areas of system development or allocate funds towards improving customer service or security measures.

On the other hand, a consequence of the disadvantage of low response rates is that it may lead to incomplete or biased data collection, resulting in gaps in understanding stakeholders' needs and preferences. In the context of the banking company's online banking system, this could mean that crucial insights from certain stakeholder groups may be missed, leading to potential oversights or misunderstandings in the system design and development process. This, in turn, could result in a system that fails to fully address the diverse needs of its users, potentially impacting user satisfaction and adoption rates.

4

Marking Guidance and Rubric:

The provided answer is just a sample answer, all other answers should be marked based on the following rubric:

Mark	Application AO2 - 2 mark	Mark	Analysis AO3- 2 marks
2	The consequences of both the advantage and disadvantage are clearly relevant to the provided context.	2	The consequences of both the advantage and disadvantage are discussed effectively, demonstrating a clear understanding of how they impact the context provided.
1	Consequences of the advantage or disadvantage are discussed, but the relevance to the provided context is somewhat unclear or lacking in depth.	1	The consequence of either the advantage or the disadvantage is provided, but not both. Or the consequences of both the advantage and disadvantage are lacking depth and clarity.
0	No relevance of the discussion to the provided context	0	No consequences are discussed, or the discussion is irrelevant.

Learning Outcome	Analyze the advantages and disadvantages of each analysis method
Learning Level	AO2, AO3
Pages	S1. 344-p345

17.c

Answer:

A sample Answer:

A prototype is a 'mockup' of a software solution in a primitive form.

Marking Guidance and rubric:

The provided answer is just a sample answer, any other correct answer should be marked based on the following rubric.

Mark	Remembering and understanding (AO1) - 1 mark
1	Accurate definition is provided.
0.5	Partial or somewhat accurate definition is provided.

1

0	No definition is provided, or the provided definition is incorrect or irrelevant.

Learning Outcome	Define the term prototype
Learning Level	AO1
Pages	S1. 368

[End of Marking Guide]

SULTANATE OF OMAN
MINISTRY OF EDUCATION

Marking Guide of General Educational Diploma for Private Schools

2023/2024

Semester TWO – Second Session

Subject: ICT

Note: There are 15 pages in this guide

First: Answers for the Multiple-Choice Items (8 Marks):

N.	Answer	Mark	Learning Outcome	Learning Level
1	B Direct changeover	1	Identify methods of implementation	AO1
2	A Phased implementation.	1	Explain the four methods of implementation	AO2
3	C It assists users in software installation, operation, and troubleshooting.	1	Define the term user documentation	AO1
4	A Evolutionary prototyping	1	Explain different types of prototyping and explain why each is needed.	AO1
5	D Throwaway/rapid	1	Evaluate the advantages and disadvantages of each type of Prototyping.	AO2
6	D base color of the object.	1	Explain the properties of different color systems (RGB, HSL, CMYK, CMS).	AO1
7	B RGB	1	Explain the properties of different color systems (RGB, HSL, CMYK, CMS).	AO2
8	C The number of colors that can be displayed per pixel in an image.	1	Define color depth	AO1

Second: Answers for the Extended Response Items (32 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.

N.	Correct Answer	Mark
9	**Answer:** **Any TWO of the following:** • Data flow: this is the data that is flowing throughout the system. • Process: This is an action that uses or manipulates data. • Data store: This is a place where data is stored. This could be a hard disk, cloud storage or a paper file, for example. • Data source or destination: This is an external entity where the data originates or is destined. • Duplication data source or destination: This is where we have more than one source where data originates or is destined, to avoid crossing data flow. **Marking Guidance and Rubric:** *The student has to identify and briefly describe two DFD elements.* *Each element is worth 1 mark (1*2=2 marks).* *The provided answer is just a sample answer; all other answers* ***should be marked*** *based on the following rubric:*	2

Mark	Remembering and Understanding (AO1) - 2 marks
2	The answer provides two elements with two brief descriptions.
1	The answer provides either two elements or two descriptions or only one element with one description.
0.5	The answer provides one element or one description.
0	The answer doesn't provide any elements or descriptions.

Learning Outcome	Identify the elements, purposes and symbols of data flow diagram.
Learning Level	AO1
Pages	349

10	**Answer:** **Any TWO of the following:** • Manual input • Arrow • Process • Document • Multi document • Magnetic disk • Magnetic tape • Display **Marking Guidance:** *Each element is worth 1 mark (1*2 = 2 marks).* **Learning Outcome**: Identify the elements, purposes and symbols of flowcharts. **Learning Level**: AO1 **Pages**: 350 - 351	2
11. a *and* **b**	**Answer:** **Sample Answer:** **a. User Documentation** Example: A user manual for a smartphone, providing instructions on setup, usage, and troubleshooting in a simplified language for the average consumer. **b. Technical Documentation** Example: An API (Application Programming Interface) reference guide for software developers, detailing endpoints, parameters, and usage examples for integrating third-party services into their applications.	2

Marking Guidance and Rubric:

Any other examples, if correct, should be accepted.

*The provided answer for **a** and **b** is just a sample answer; all other answers **for each, a and b, should be marked** based on the following rubric:*

Mark	Application (AO2) 1 mark
1	A correct, clear example that demonstrates clear understanding of the documentation.
0.5	The example is partially accurate or incomplete example.
0	The example does not demonstrate an understanding of the documentation or is completely incorrect.

Learning Outcome	Explain why technical and user documentation is needed.
Learning Level	AO2
Pages	362 - 363

12

Answer:

A sample Answer:

1. **Its ability to accurately track food waste levels:** The software should accurately record and analyze data related to food waste generation. This includes tracking the type and quantity of food waste produced,
2. **The ease of use for students and staff:** The software should be easy to use for both students and staff members. This involves assessing the user interface design, the intuitiveness of navigation and data input processes, and the availability of support resources (such as tutorials or help documentation).

Other elements could be:

- The reliability of the data generated.
- Its ability to provide actionable insights for improving the composting program.
- Cost savings or efficiency gains attributed to the software.

2

Marking Guidance and Rubric:

The answer should identify and briefly explain two elements. 1 mark will be given to each element. The provided answer is just a sample answer; all other answers should be marked based on the following rubric:

Mark	Application (AO2) 2 marks
2	The answer offers a clear explanation of TWO evaluation elements
1	The answer provides a basic explanation of two elements, or a clear explanation of only one element.
0.5	The answer provides a partially accurate or incomplete explanation of only elements
0	No answer provided or answer lacks relevance to the question.

Learning Outcome	Identify the methods of evaluating in a new system. Identify the
Learning Level	AO2
Pages	364 - 365

13 a *and* b

Answer:

Sample Answer:

a. **CMYK:** CMYK stands for Cyan, Magenta, Yellow, and Black. It is a color model used primarily in printing, where different combinations of these colors are layered to produce a wide range of hues.

b. **CMS:** CMS stands for Color Matching System. It is not a color itself, but it is a software-based solution. This is a way that a piece of software can select a color from an image and reproduce it.

2

Marking Guidance and Rubric:

The provided answer is just a sample answer; all other answers for each, a and b, should be marked based on the following rubric:

Mark	Remembering and Understanding (AO1) 1 mark
1	The answer provides a clear definition (including letter meaning and usage) of the color system.
0.5	The answer provides a partially accurate or incomplete definition of the color system.
0	No definition provided or incorrect definition.

Learning Outcome	Explain the properties of different color systems (RGB, HSL, CMYK, CMS).
Learning Level	AO1
Pages	407

Answer:

A. lossless compression

B. lossy compression

Learning Outcome	Discuss the effects of different methods of compression on images.
Learning Level	AO2
Pages	420 - 421

14 2

15	**Answer:** **Sample Answer:** The chosen research method: **The Questionnaire.** **The Definition:** Questionnaires involve presenting a set of questions to a targeted group of participants (large number of users) to gather data about their opinions, preferences, and behaviors. **The discussion of the advantage:** **The advantage: Questionnaires can reach a large number of respondents efficiently:** Questionnaires allow the tech company to efficiently reach out to a diverse range of remote workers, including freelancers, telecommuters, and employees of remote-first companies, regardless of their geographical location or time zone. This broad reach ensures that the company receives input from a representative sample of potential users, capturing a wide range of perspectives and requirements, without wasting too much time and efforts. *Note: Other advantages could be:* • The questionnaire allows for the collection of quantitative data, enabling statistical analysis to identify trends and patterns. • Questionnaires can be conducted remotely, making them convenient for both researchers and participants. **The discussion of the disadvantage:** **The disadvantage: Certain nuances or contextual information may be missed in the structured format of Questionnaires:** Questionnaires typically consist of closed-ended questions with predefined response options, limiting the depth of insights that respondents can provide. While structured questions are efficient for collecting quantitative data and measuring trends, they may overlook the intricacies and nuances of remote work experiences that could significantly impact the design and functionality of the mobile application. For example, a questionnaire might ask about preferred communication tools without exploring the specific challenges remote workers face in communication across different time zones or cultural contexts. *Note: Other disadvantages could be:* • Questionnaires may lack depth in understanding as they often provide limited opportunities for participants to explain their responses. • There's a risk of low response rates or biased responses if not carefully designed and distributed.	6

Another Sample Answer:

The chosen research method: **The Interview.**

The Definition:

Interviews involve direct one-on-one or group discussions (direct conversation) with participants to gather qualitative data by exploring their experiences, perspectives, and opinions in depth.

The discussion of the advantage:

The advantage: Interviews allow for a deeper understanding of participants' thoughts, feelings, and behaviors, providing rich and detailed insights:

Interviews provide a platform for participants to articulate their thoughts and feelings in their own words, allowing for a nuanced exploration of complex topics related to remote work and mobile application usage. Participants can share their experiences, challenges, and aspirations in depth, offering the tech company a comprehensive understanding of the multifaceted issues at play. This depth of exploration is invaluable for uncovering hidden insights and identifying opportunities for innovation and improvement.

Note: Other advantages could be:

- Researchers can probe further and ask follow-up questions to clarify responses and uncover underlying reasons.
- Interviews enable researchers to capture nuances and contextual information that may not be apparent in surveys.

The discussion of the disadvantage:

The disadvantage: Interviews can be time-consuming and resource-intensive, especially if conducted face-to-face:

Time is of the essence in the tech industry, where product development cycles are often fast-paced and competitive. The time commitment required for scheduling and conducting face-to-face interviews with remote workers can potentially delay the research phase of the project, impacting the overall development timeline of the mobile application. This delay may hinder the company's ability to gather timely insights and iterate on the application design and features accordingly, potentially putting it at a disadvantage in the market.

Note: Other disadvantages could be:

- There's a potential for interviewer bias or influence on participants' responses.
- Analysis of interview data may be more subjective and require more interpretive effort compared to quantitative data from surveys.

Marking Guidance and Rubric:

2 marks for the definition of the method (AO1)

2 marks for the discussion of one advantage (1 for the clear discussion with at least one clear consequence (AO3) and 1 mark for linking the discussion to the context of the tech company (AO2)).

2 marks for the discussion of one disadvantage (1 for the clear discussion with at least one clear consequence (AO3) and 1 mark for linking the discussion to the context of the tech company (AO2)).

*The provided answer is just a sample answer; all other answers **should be marked** based on the following rubric:*

Mark	Remembering and Understanding (AO1) 2 marks	Mark	Application (AO2) 2marks	Mark	Analysis (AO3) 2 marks
2	A clear concise definition of the chosen method is provided.	2	A clear and precise link exists between the discussion of both, the advantage and the disadvantage, and the provided context of the tech company.	2	A clear and concise discussion of both, an advantage and disadvantage with at least one consequence for each.
1	The definition of the method is provided but is partially clear.	1	A link exists between the discussion of the advantage and the disadvantage and the provided context but it lacks clarity or precision. Or, a clear link exists between the discussion of either the advantage or the disadvantage, but not both, and the provided context.	1	A clear discussion of either an advantage or disadvantage, but not both, with at least one clear consequence. Or, a basic discussion, that lacks clarity, of both, an advantage and disadvantage.
0	No definition of the method is provided, or the provided definition is not relevant..	0	No application or irrelevant application is provided.	0	No discussion or irrelevant discussion is provided.

Learning Outcome	Explain the methods of researching. Analyze the advantages and disadvantages of each analysis methods.
Learning Level	AO1, AO3, AO4
Pages	344 – 346

16

Answer:

- **Valid (also called normal data):** Data that will be accepted by the validation rule.
- **Invalid (also called abnormal or erroneous data):** Data that will not be accepted by the validation rule.
- **Extreme (also called extreme data):** Data that will only be accepted by the validation rule because it is at the limit of acceptability.
- **Live data:** refers to real-world or production-like data that simulates actual usage scenarios encountered in a live environment.

Marking Guidance:

*1 mark for the definition of each type of testing data (1*4 = 4 marks).*

Learning Outcome	Explain the types of testing (Valid, Invalid, Extreme, and live data)
Learning Level	AO1
Pages	356 - 357

4

17	**Answer:** **A sample Answer:** **The meaning:** Image editing refers to the process of altering or enhancing digital images using software tools. This can involve various modifications such as adjusting colors, removing or adding elements, or applying filters to achieve desired visual effects. **The discussion of the issue and its impact:** One significant issue associated with image editing in society is the proliferation of memes and the potential harm caused by making fun of people. Memes, often created through image editing, have become a prevalent form of online communication and entertainment. However, the use of edited images in memes can perpetuate harmful stereotypes, spread misinformation, and contribute to cyberbullying. The impact of this issue is evident in the negative consequences it can have on individuals' mental health and well-being, including feelings of humiliation, embarrassment, and social isolation. **The example:** A real-world example illustrating this issue is the circulation of edited images of individuals on social media platforms accompanied by mocking captions or memes. For example, imagine the case of a person whose photo is digitally manipulated to focus on certain physical features, such as weight, facial expressions, or clothing choices, to create a meme intended to ridicule or mock them. The dissemination of such memes can lead to public humiliation and embarrassment for the individual depicted, causing emotional distress and psychological harm. Furthermore, the widespread sharing of these memes can perpetuate harmful stereotypes and negative perceptions of certain groups, exacerbating social stigmatization and discrimination.	4

Marking Guidance and Rubric:

1 mark for the meaning of image editing (AO1)
1 mark for the real-world example (AO2)
2 marks for discussing the issue and its impact (AO3).
The provided answer is just a sample answer; all other answers ***should be marked*** *based on the following rubric:*

Mark	Remembering and Understanding (AO1) 1 mark	Mark	Application (AO2) 1 mark	Mark	Analysis (AO3) 2 marks
1	A clear concise description of the meaning is provided.	1	A relevant real-world example, and the discussion is relevant to the chosen example.	2	A problem associated with image editing is discussed, providing a clear insight into is implications, and the consequence is clearly described.
0.5	The description of the meaning is provided but lacks clarity or precision.	0.5	A relevant real-world example, and the discussion is somewhat relevant to the chosen example but lacks specificity.	1	A problem associated with image editing is discussed, but no clear reasonable consequence is stated, or the discussion of the problem and its consequences lacks depth and clarity.
0	No description of the meaning is provided, or the provided meaning is not relevant.	0	No relevant or coherent real-world example.	0	No problem associated with image editing is discussed, or the discussion is not relevant.

Learning Outcome	Explain the problems associated with image manipulation in society.
Learning Level	AO1, AO2, AO3
Pages	400

Answer:

A sample Answer:

The suitable implementation method for introducing the new student information system at the high school would be **Pilot Implementation**. This approach involves deploying the system in **a small-scale, controlled environment initially, allowing for thorough testing and evaluation before full deployment.** Pilot implementation enables the school to **assess system functionality** and **gather user feedback** effectively, **minimizing the risk** of widespread disruptions and **ensuring a smoother transition** for all stakeholders.

Marking Guidance and Rubric:

*The provided answer is just a sample answer; all other answers **should be marked** based on the following rubric:*

Mark	Application (AO2) 2 marks
2	Accurate implementation method is provided with clear justification.
1.5	Somewhat accurate implementation method is provided with partial justification.
1	The implementation method is correct, but the justification is irrelevant.
0	No implementation method is provided, and incorrect or irrelevant justification.

18.a 2

Learning Outcome	Explain the four methods of implementation.
Learning Level	AO2
Pages	360 – 362

Answer:

The best maintenance approach based on the given scenario is the Adaptive Maintenance.

The discussion:

This maintenance type ensures the smooth operation and long-term viability of the new student information system. Adaptive maintenance involves making continuous adjustments to the system to accommodate evolving user needs, and changes in the school environment. By prioritizing adaptive maintenance, the school can ensure that the system remains responsive and relevant over time, optimizing its performance and usability to support the school's objectives effectively.

18.b

Marking Guidance:

2 marks for suggesting the best maintenance type based on the given scenario (AO4)

2 marks for discussing why this maintenance type is the best, by considering the given two factors. The discussion must include at least one clear consequence (AO3).

4

Learning Outcome	*Explain adaptive maintenance with an example.*
Learning Level	AO3, AO4
Pages	365 - 366