KOLEJ MATRIKULASI PULAU PINANG
SEMESTER / SESI : 01 - 2023 / 2024
NAMA SUBJEK: **SAINS KOMPUTER 1**
PRA PSPM SC015
MASA: **120 MINIT**
NAMA PELAJAR   :
KUMP. PRAKTIKUM :

Answer all the questions in the space provided in the question paper.

1. The information processing cycle enables computers to perform various tasks such as calculations, simulations, graphics, animations, games, etc. by applying different instructions to data.

    (a) Aishah is taking a photo with her smartphone. She taps the screen to focus on her subject and then presses the shutter button to capture the image. The image is then saved in her phone's memory. State what operation is being performed when the image is saved in Aishah phone's memory?

    [1 *mark*]

    (b) Alicia drives to Sunrise Carnival Mall that has a cashless parking system that accepts Touch 'n Go cards. A cashless parking system is a parking and payment system that does not require the physical need for cash. It uses a prepaid card or an e-wallet app.

    Based on the scenario of how Alicia uses a Touch 'n Go card for cashless parking system in Sunrise Carnival Mall, explain **one** (**1**) activity for each operation in the information processing cycle.

    [4 *marks*]

Operation	Activities
Input	
Process	
Output	
Storage	

(c) A number system is defined as a system of writing that is used to express numbers. Convert the following numbers to the correct base. Show your calculations.

   i. 11110101_2 to decimal

[3 *marks*]

   ii. $ADAB1_{16}$ to binary

[3 *marks*]

   iii. 101101000101110_2 to hexadecimal

[3 *marks*]

(d) Calculate the sum of $11011_{10} + 1DA0_{16}$. Write your answer in decimal. Show all the steps.

[4 *marks*]

(e) An information coding scheme is a set of rules or standards that is used to convert data from one form to another, such as from text to binary digits, for computers to process and understand.

i. You're a web developer creating a multilingual website that mainly serves Western European languages. You've picked an encoding scheme called 'X,' but it has limitations when it comes to characters beyond ISO-8859-1. What is the encoding scheme 'X'?
*[*notes: ISO-8859-1 primarily covers characters used in Western European languages.]*

[1 *mark*]

ii. Statements given in Table:1 are referred to the types of Information Coding Scheme.

Statement A	"This coding scheme uses a variable-width encoding and can represent characters from virtually all the world's writing systems, including emojis and special symbols."
Statement B	"Primarily used on IBM mainframes, this coding scheme is known for its fixed width encoding and is commonly associated with legacy systems."

Table:1

Based on statement in Table:1, differentiate between these two types based on the characteristic given.

[4 *marks*]

	Number of characters can be represented	Context of use
Statement A		
Statement B		

2. (a) LightAi company is installing a smart home security system in the customer's house. The system features door sensors, window sensors, and motion detectors designed to safeguard the home against intruders. The logic for triggering the alarm operates as follows:

   • The alarm will activate if either the front door is opened, or the living room window is opened.
   • In addition to the above condition, the alarm will only be activated if the motion detector in the hallway detects movement.

   i.   Write Boolean expression that represents the condition described in the scenario.
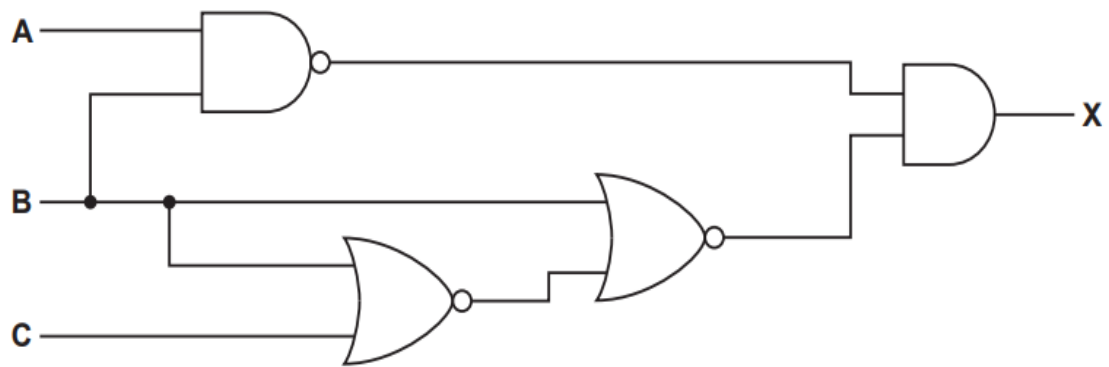
[3 *marks*]

   ii. Create a logic circuit diagram to represent the condition described in the scenario.

[3 *marks*]

   iii. Construct a truth table for the smart home security system.

[3 marks]

(b) Derive a Boolean Expression based on the logic circuit.

[5 *marks*]

(c) Draw the logic circuit diagram based on a given Boolean Expression as below:

$$Y = ((A \cdot B') \oplus (B \oplus C'))'$$

[6 *marks*]

3. (a) Mr. Ahmad owns a local courier company that provides services all around Bertam. He wants to set up a network for his main office that has high security, scalability, and centralized storage. The devices include two (2) PCs, one (1) laptop, one (1) printer, and one (1) scanner which can be shared among the staff. Any extra necessary devices can be added.

    i.   Identify the most suitable network architecture for Mr. Ahmad's office.

[1*mark*]

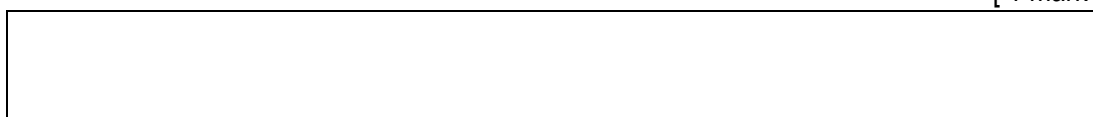ii.   Illustrate the network architecture including all nodes involved.

[5 *marks*]

(b) Sarah wants to download a rare movie not available on popular streaming services. She connects to the internet and uses specialized software to find and acquire the movie. The download process involves receiving parts of the movie from multiple sources at the same time.
  i.   What type of network architecture might Sarah be using to download this movie.

[1 mark]

ii.   Justify your answer in 3(b) i

[2 *marks*]

(c) Identify one (1) suitable network classification for each given statement or scenario.

[3 *marks*]

Statement / Scenario	Network Classification
i. A multinational company uses a global network to connect its offices around the world, enabling smooth communication and data sharing between distant locations.	
ii. In 1974, Cambridge University developed the Cambridge Ring, which helped connect the computing devices used within the university campus.	

iii. This network uses the services of carriers, such as telephone companies, cable companies, satellite systems, and network providers.	

4. (a) In our connected world, network technologies are essential for communication and collaboration. Two key types, intranets and extranets, serve different purposes.

   i. Explain the differences between Intranet and Extranet using the table provided.

   [4 *marks*]

	Intranet	Extranet
Accessibility		
Usage		

   ii. Name two ways an intranet ensures data security and privacy for an organization's internal information.

   [2 *marks*]

(b) An internet address often referred to as an IP address is like a unique number given to each device on the internet.

   i. Explain the challenge that arises in the context of IP addresses as the Internet of Things (IoT) era witnesses an increasing number of connected devices.

   [2 marks]

   ii. Describe the solution for the challenge in 4(b) i

   [2 *marks*]

5. (a) Based on the following scenarios, determine the area of computer ethics involved

[2 *marks*]

Scenario	Area of Computer Ethics
i. An instructor saw a striking resemblance between four programs submitted by various students. It seems that three pupils from one class stole a computer program from another, altered the names of a few variables, and submitted it under their own name.	
ii. A desktop computer owned by Wahab is no longer functional. So, he is considering submitting it to an e-waste firm.	

(b) Figure 1 shows a conversation between a student and his lecturer.
Based on Figure 1, list one (1) netiquette guideline that needs to be followed.
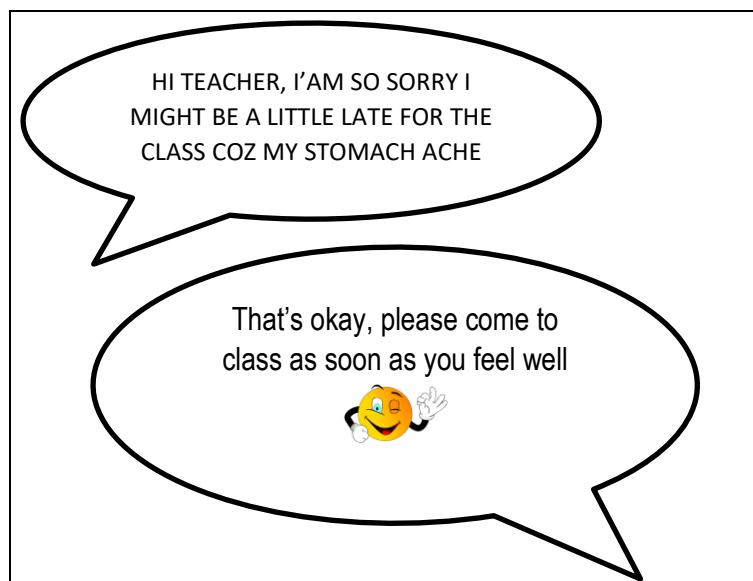
[1 *mark*]

HI TEACHER, I'AM SO SORRY I MIGHT BE A LITTLE LATE FOR THE CLASS COZ MY STOMACH ACHE

That's okay, please come to class as soon as you feel well

Figure1

(c) State two (2) good practice to follow and comply with netiquette rules when using a real-time online learning platform.

[2 marks]

6. A popular online retail company is looking to revamp its existing e-commerce platform to enhance user experience and expand its product offerings. The company aims to develop a more user-friendly online shopping system to attract a larger customer base and improve sales.

(a) According to the situation, System Development Life Cycle (SDLC) is applied as an organized method to design, build, test, and manage new system development. SDLC also involves several key roles and individuals who play distinct roles in each phase of the development process.

What role does the Steering Committee play in SDLC?

[1 mark]

| |
| |

(b) Based on the deliverable in the following table, state the phase of SDLC and list one (1) activity of the phase.

[4 *marks*]

Phase	Activity	Deliverables
		• budget allocation for each resource category, including personnel, equipment, software, and other required
		• Compliance and Certification Reports • Deployment plan

(c) Given the activity provided in the table, Identify the corresponding phase of the SDLC and the deliverable typically associated with that phase.

[4 *marks*]

Phase	Activity	Deliverables
	Conduct preliminary investigation.	
	Acquire Hardware & Software	

END OF QUESTIONS