1. A computer system is a set of integrated devices that input, output, process, and store data and information. It's currently built around at least one digital processing device.

(a) Sarah is interested in understanding how the information processing cycle is applied for petrol purchasing at a modern petrol station by using a credit card as the method of payment. Help her clarify the different stages of the processes involved. Provide a detailed explanation about the input, process, output and storage activities.

[6 marks]

Operation	Activity
Input	System reads credit card details System reads amount of petrol to be purchased by customer
Process	System verifies data from credit card System approved customer's purchasing amount
Output	System displays options at the display panel System displays message to return the nozzle System issues receipt
Storage	System saves new total sales to a database System saves new petrol inventory

(b) Convert 11010101110_2 to decimal. Show your calculations.

[4 marks]

$(1 \times 2^{10}) + (1 \times 2^9) + (0 \times 2^8) + (1 \times 2^7) + (0 \times 2^6) + (1 \times 2^5) + (0 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)$

$= 1024 + 512 + 0 + 128 + 0 + 32 + 0 + 8 + 4 + 2 + 0$
$= 1710_{10}$

(c) Convert $A10B_{16}$ to decimal. Show your calculations.

[4 marks]

$(10 \times 16^3) + (1 \times 16^2) + (0 \times 16^1) + (11 \times 16^0)$
$= (10 \times 4096) + (1 \times 256) + (0 \times 16) + (11 \times 1)$

$= 40960 + 256 + 0 + 11$
$= 41227_{10}$

1

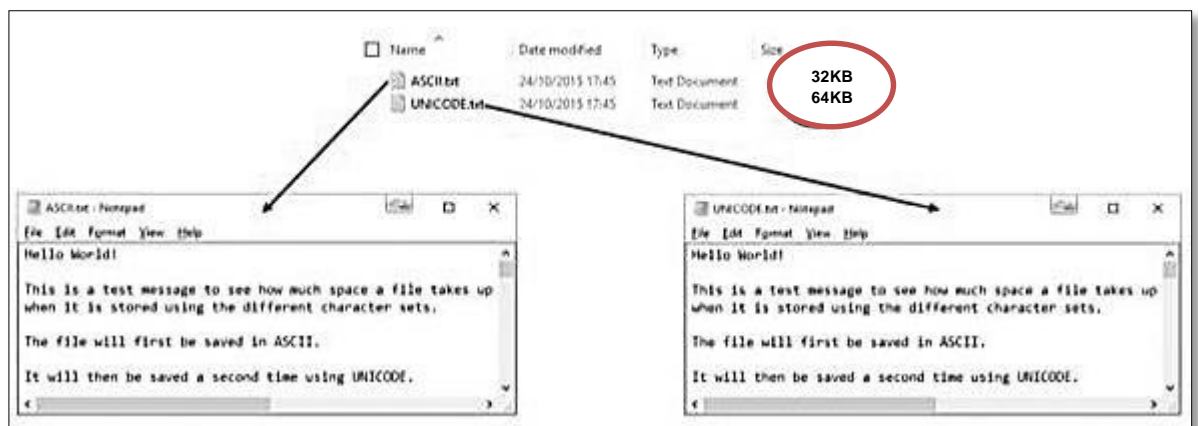(d)   Convert $15FB_{16}$ to binary. Show your calculations.

[4 marks]

1	5	F - 15	B - 11
2^3 2^2 2^1 2^0	2^3 2^2 2^1 2^0	2^3 2^2 2^1 2^0	$2^3 2^2 2^1 2^0$
8 4 2 <u>1</u>	8 <u>4</u> 2 <u>1</u>	<u>8 4 2 1</u>	<u>8</u> 4 <u>2</u> 1
0 0 0 1	0 1 0 1	1 1 1 1	1 0 1 1

$15FB_{16}$ = 0001 0101 1111 1011_2

(e)   Both these text files contain exactly the same contents. One is stored using the ASCII character set and the other in UNICODE. Explain the difference in size used to store both files.

[2 marks]

- The ASCII character set and the Unicode character set represent characters using different encoding schemes, which can lead to differences in file size.
- The file size that uses ASCII code will be relatively small because each character is represented with a single byte (8 bits) compared to a file that uses Unicode as each character is represented by 16 bits.
- ASCII uses 8 bits to represent each character, while Unicode uses 16 bits to represent each character so the file size would be different.
  **Accept suitable answer

2

2. A logic gate is a device that acts as a building block for digital circuits. Most electronic devices we use today will have some form of logic gates in them. Answer the following questions below.

(a)   Dhiya is at a coffee shop and she wants to buy a drink. She has three options: coffee or tea. She has certain preferences that will help her make her decision:

She prefers coffee over tea.
If she chooses tea, she will add honey to it.

Based on Dhiya's preferences, derive a Boolean expression that represents her decision-making process for choosing a drink?

Use the following variables.
     Y = Drink chosen
     C = Dhiya chooses coffee
     T = Dhiya chooses tea
     A = Dhiya adds honey to her tea

[4 marks]

Y=C+(T.A)

(b)   Construct a truth table based on a Boolean expression below.

Z= A⊕B+C

[8 marks]

A	B	C	A⊕B	Z = A⊕B+C
0	0	0	0	0
0	0	1	0	1
0	1	0	1	1
0	1	1	1	1
1	0	0	1	1
1	0	1	1	1
1	1	0	0	0
1	1	1	0	1

3

(c)   Hafiz is at the library. He wants to borrow a book to help him do his research for his assignment. In order to do so, he must have a library membership and the book he wants is available on the rack. He also needs to be sure that the librarian is not away from the library's counter.

Based on the scenario above, draw a simple logic circuit along with the list of variables you use to indicate your logic circuit.
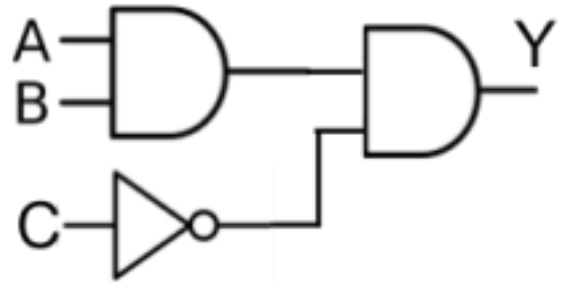
[4 marks]

List of variables
Y = Borrow book
A = has library membership
B = book available on the rack
C = Librarian away from the counter

3.   (a) In the security office of a busy airport terminal, the security team is tasked with monitoring the waiting area to ensure the safety and security of passengers. There are six surveillance cameras strategically placed throughout the waiting area to monitor customer activities. The security team needs to access these camera feeds in real-time, review recordings, and control the cameras as needed to respond to security incidents.

The security office also has a centralized computer system with high processing power and storage capabilities that can handle video data efficiently. The team needs a network architecture to connect the cameras to this central system and enable the security personnel to monitor and manage the surveillance efficiently.

(i)   Identify appropriate network architecture that should be used by security teams.
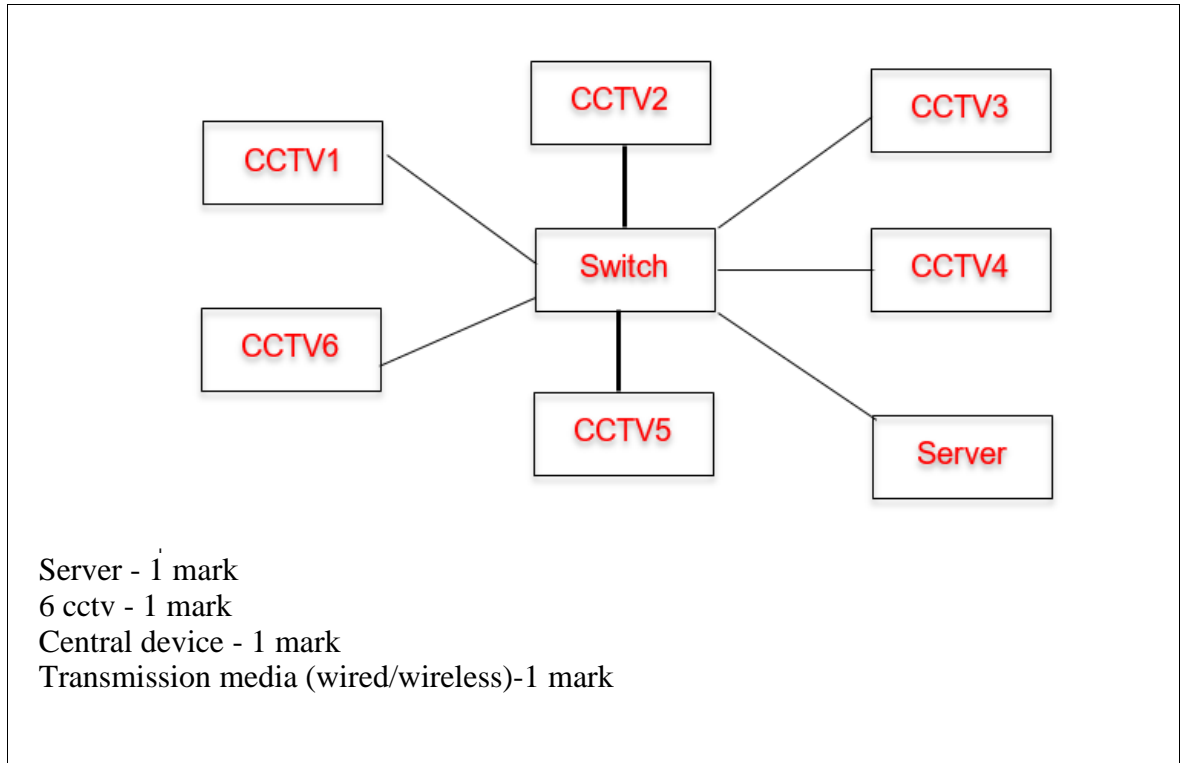
[1 mark]

Client/ Server Network

(ii)   State the advantages of network architecture that you have identified in Question 3(a)(i) in terms of real-time monitoring and data storage.

[2 mark]

▪   Security personnel can access and control the cameras from a single point, enabling streamlined monitoring and quick responses to security incidents.
▪   Allows security personnel to view live feeds from all cameras simultaneously, ensuring prompt detection and response to any suspicious activities or security threats.
▪   Client-server architecture is scalable, allowing for the addition of more cameras or expansion of storage capacity as needed.
▪   Centralized server provides ample storage capabilities to store video recordings from the surveillance cameras

(ii) Illustrate the network architecture that you have identified in Question 3(a)(i).

Server - 1 mark
6 cctv - 1 mark
Central device - 1 mark
Transmission media (wired/wireless)-1 mark

(c) Sazariani are working as an IT consultant for a small business that is planning to expand its operations. The business currently has a single office location, and they are considering opening a existing office in a different city. As an IT consultant, Sazariani need to advise them on the network infrastructure they should set up for their existing and new offices.

Provide recommendations on network type would be suitable for the **existing office** and the **new office** in a different city with the ownership aspect.

[4 marks]

	Network Classification	Ownership
Existing office	Local Area Network (LAN)	Own by individual or an organization

New Office	Wide Area Network (WAN)	Collective or distributed ownership

4. (a) Company AiBus provides an online bus ticketing service for customers to search and purchase bus tickets all over Malaysia. All staff, partners and customers need to register an account, so that they can access the online system but limited to the levels as labeled A, B, and C in the Figure 1.
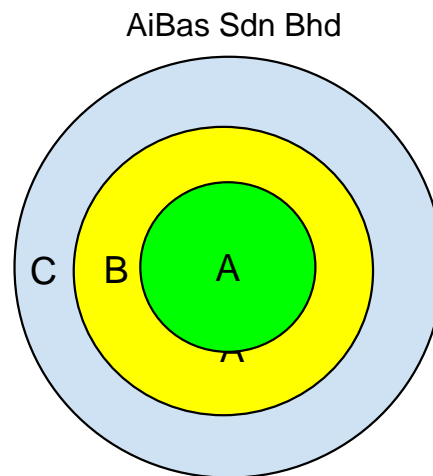
AiBas Sdn Bhd

Figure 1

Based on Figure 1 above, differentiate between A and B in terms of accessibility of information by users in Company AiBus.

[4 marks]

A	B
Information accessible by the company's employees, staff, and perhaps specific partners who require internal access to certain resources or systems	Information is accessible to selected external users, such as partners, suppliers, or, in the case of AiBus, potentially registered customers.

(b) An IP address (Internet Protocol address) is a numerical label assigned to each device participating in a computer network that uses the Internet Protocol for communication.

  (i) Explain one (1) reason why an IPv6 address is composed of 128 bits, whereas an IPv4 address contains 32 bits.
    [2 marks]

- IPv6 address is composed of 128 bits, while an IPv4 address contains only 32 bits, is the **need for a significantly larger address space in IPv6 compared to IPv4.**

- IPv6 increases the IP address from 32 bits to 128 bits **to support larger address demands.**

  (ii) Write one (1) example of a domain name that replaces the need for an IP address when accessing a website

    [2 marks]

google.com, wikipedia.org, youtube.com

- Any acceptable answer/domain name

  (iii) Provide an example of a domain name that combines an educational gTLD (Generic Top-Level Domain) and a ccTLD (Country Code Top-Level Domain) within the Top-Level Domain
    [2 marks]

kolejkau.**ac**.**uk**, kolejku.**edu**.**my**

(Any acceptable answer)

> INFO -".ac" , "".edu" is a gTLD commonly used by educational institutions and stands for "academic." and " education"
> ".uk", ".my" is the ccTLD for the United Kingdom and Malaysia, indicating the geographic location or country affiliation of the domain.

5. (a) Computer ethics is the set of moral guidelines that govern the use of computers and information systems.

Based on the provided scenario, identify areas of computer ethics that are relevant to the situation.
[3 marks]

Scenario	Areas of computer ethic
(i) EcoTech Solutions has designed its office space with energy efficiency in mind. They use LED lighting and install motion sensors to ensure that lights are only active when necessary.	Green computing

(ii) SecureTech Solutions has implemented rigorous procedures for software procurement and licensing. They ensure that all software used within the company is acquired legally, and all necessary licenses are obtained. This includes both proprietary and open-source software.	Software piracy
(iii) HarmonySounds Records ensures that all artist contracts clearly outline the ownership and rights associated with the music created. These contracts specify how royalties are distributed, and the company respects the artists' creative control over their work.	Intellectual property rights

(b) Imagine you are participating in an online discussion forum for a class project. One of your classmates, who has a different opinion, has posted a strongly worded response to your initial post.

Posting : What are your opinions of using social media among youngsters today?
Alia : I found it has good benefits to youngsters including connection, learning and creativity.
Keifli : I found it sucks. HATE IT!
Irdina : For me, social media has become an integral part of the lives of young people today, with a significant impact on their behavior, social interaction, and mental health.
Keifli : What a stupid opinion, Irdina! Hdgggsishjhkjowjkoj

(i) Give **two (2)** rules of netiquette that should be applied by Keifli when participating in an online discussion forum.

[2 marks]

- Be respectful of other users and their opinions.
- Be polite, avoid offensive language
- Do not use all capital letters, which is consider as shouting.
- Use correct spelling and grammar.
  (or any other acceptable answer)

(ii) Suggest one feedback should Keifli respond to his friend posting.

[1 mark]

"Thanks for your opinion." or "I agree with you." or "I am sorry, but I do not agree with you"
or any acceptable answer.

6. You are a project manager in WebTech Sdn. Bhd., and you've been assigned to oversee the creation of an online marketplace platform for a client. The client's vision is to build a comprehensive platform that connects buyers and sellers, offering a wide range of products with advanced search and recommendation features.

(a) Identify the suitable SDLC phase for activities below:

[3 marks]

Activities details		Phase
(i.)	Your web designers work on creating a visually appealing and user-friendly interface. They focus on layout, navigation, and the overall user experience, ensuring that it meets the client's vision.	Design
(ii.)	You analyze the e-commerce landscape, studying competitors and industry trends. This research will provide insights into what features will make the online marketplace stand out.	Analysis
(iii.)	Your development team begins building the online marketplace platform based on the design specifications. This includes coding the application, setting up the database structure, and integrating various features.	Implementation

(b.) For every deliverable that produce from the planning phase, give the suitable activities for each of them.

[4 marks]

Planning phase		
Deliverable		**Main Activity**
(i.)	Estimate and allocate the budget required for each resource, taking into account labor costs, equipment, and any other associated expenses.	Allocate resources
(ii.)	Review the project's goals and objectives to ensure they align with the business requirements.	Review project request
(iii.)	Evaluate the project requirements against the defined criteria and prioritize them accordingly.	Prioritize project request
(iv.)	Determine the roles and skills required for the project, such as project manager, developers, designers, testers, etc.	Form project development team

END OF QUESTIONS
KERTAS SOALAN TAMAT