SC015
Computer Science 1
Semester 1
2023/2024
2 hours

SC015
Sains Komputer 1
Semester 1
Sesi 2023/2024
2 jam

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KOLEJ MATRIKULASI PERAK
PERAK MATRICULATION COLLEGE

PRA PEPERIKSAAN SEMESTER PROGRAM MATRIKULASI
MATRICULATION PROGRAMME TRIAL EXAMINATION

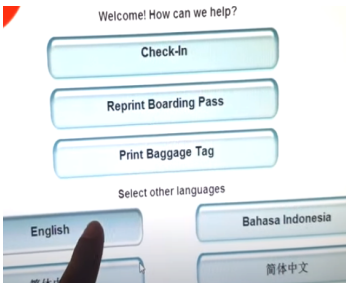
SAINS KOMPUTER
2 jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU.
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

Untuk Kegunaan Pemeriksa		
No. Soalan	Markah	Markah Pemeriksa
1	5	
2	21	
3	19	
4	22	
5	4	
6	9	
JUMLAH	80	

1 (a) **Figure 1,** 1(x), 1(y) and 1(z) shows how the passengers use kiosks in airports to print bag tags for their luggage.

(x)



(y)

(z)

Figure 1

List **two (2)** other steps in the information processing cycle that are not shown in **Figure 1**.

[2 marks]

_____

_____

(b) Sarifah used Pagoda.com to reserve a hotel for her whole family to stay in for a vacation in Kelantan, Malaysia in December. A website menu is displayed in **Figure 2.**

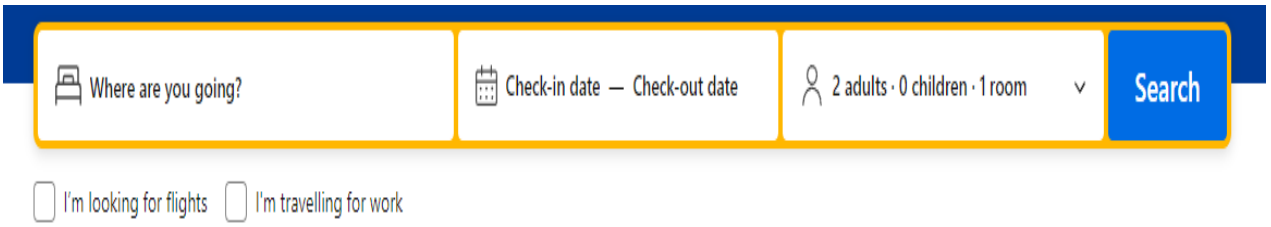


Figure 2

With the aid of **Figure 2**, describe **three (3)** different types of the Information processing cycle activities in **Table 1.**

[3 marks]

Operation	Explanation
Operation 1	
Operation 2	
Operation 3	

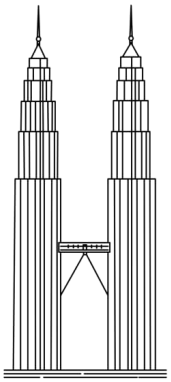
Table 1

2.

(a) Ali has an **FF**$_{16}$ GB pen drive. The pen drive has existing data of **DE**$_{16}$ GB. Calculate in GB how much space in the pen drive left. Write your answer in binary number.

[*2 marks*]

(b) **FIGURE 3** shows the heights of KLCC Tower and KL Tower in meters (decimal number). Calculate the total height between two towers in the hexadecimal numbering system.



Petronas Twin Towers (452m)

KL TOWER (421m)

Figure 3

[*2 marks*]

(c) A computer can understand only a few symbols called digits and these symbols describe different values depending on the position they hold in the number. In general, the binary number system is used in computers.

(i) Convert **DF753**$_{16}$ to binary number. Show your steps.

[2 *marks*]

(ii) Convert $\mathbf{FF1_{16}}$ to the decimal number. Show your steps.

[2 *marks*]

(iii) Show the conversion of $\mathbf{11110010_2}$ to the decimal number.

[2 *marks*]

(iv) Calculate $\mathbf{A12_{16} + 101_2}$ and write the answer in decimal number.

[5 *marks*]

(v) Convert $\mathbf{11010110011100000111111110_2}$ to the hexadecimal number.

[2 *marks*]

(d) A software company is developing a system that will interface with both modern web platforms and legacy IBM mainframe systems. This system is expected to process text data from multiple international sources, including languages such as English, Russian, Mandarin, and Hindi. The development team is evaluating different character encoding schemes to find a balance between compatibility with both the modern and legacy systems, and comprehensive language representation.

(i) Which coding schemes are native to IBM mainframe environments and modern web platforms, respectively?

[2 marks]

(ii) Compare the above coding schemes according to the number of characters represented.

[2 marks]

3

(a) Based on the Boolean expression **Y = (A ⊕ B)' + (A' ⊕ B')**, construct the truth table

[3 marks]

(b) Given the Boolean expression **Q = ((A . B') + (B' ⊕ C))'** draw the logic circuit:

[6 marks]

(c) Imagine you are designing a smart home security system that incorporates multiple safety features. Each feature operates based on a combination of sensors, which can either be in an 'active' (1) or 'inactive' (0) state. For each of the scenarios described below, write the Boolean expression, draw the appropriate logic circuit and provide the corresponding truth table.

(i) A loud siren will go off if there is NO smoke detected in the kitchen AND there is a gas leak.

[2 marks]

Boolean expression : _____
A (input) : _____
B (input) : _____
Y (output) : _____

Draw the logic circuit:

[3 marks]

(ii) The garage door should open if either the car's proximity sensor detects the car or the garage door is already open. However, a safety mechanism should prevent the door from opening if both conditions are true at the same time.

[2 marks]

Boolean expression : _____
A (input) : _____
B (input) : _____
Y (output) : _____

Complete the truth table:

[3 marks]

4.

(a) Datuk Azam, one of the successful businessmen in Malaysia has opened a new branch in Penang. As the person in charge, you are required to set up a wired network for his new office which will consist of four (4) computers, one (1) printer and one (1) suitable communication device. The network should be easy for them to do the data backup and the file management can be done in a centralized way.

(i) Identify the suitable network architecture for the above situation.

[1 mark]

_____

(ii) Briefly describe the network architecture you have mentioned in **1(a)**.

[2 marks]

_____

_____

(iii) Illustrate the network architecture that you have suggested.

[5 marks]

(b) A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and applications. A computer network can be classified by their coverage area of size.

Figure 4 shows two categories of networks which are classified according to their geographical coverage area.

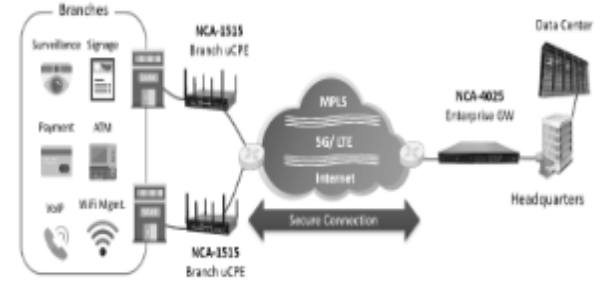
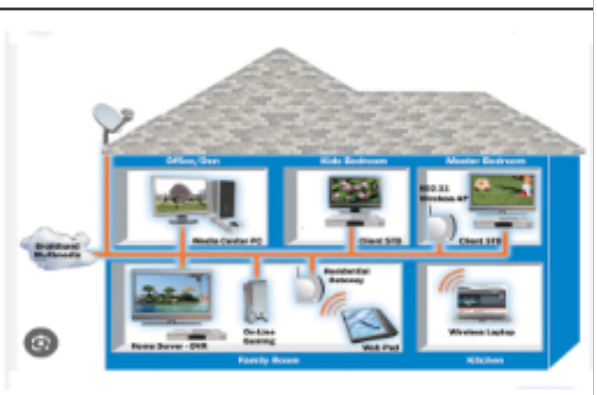
NETWORK A	NETWORK B
	

Figure 4

Based on the **Figure 4**

(i) State the classification of Network A and Network B

[2 marks]

A	B

(ii) Give **one (1)** difference between A and B from the network ownership 's aspect..

[2 marks]

NETWORK A	NETWORK B

(c) Study **two (2)** scenarios given and answer the question.

Scenario	Description
A	Sabariah was appointed as the Head of Department at Kolej Matrikulasi Terengganu. As the Head of Department, she was given an account to access the Matrix Information System. She was given permission to verify the student's result and approve the lecturer's leave under her supervision.
B	The parent was given an account to access the Matrix Information System to check their children's record. They are also allowed to update student's information through the Matrix Information System under the 'Parent' menu.

(i) Distinguish **one (1)** characteristic between Internet technology used in scenario A and scenario B.

[4 marks]

Scenario A	Scenario B

(ii) State **one (1)** usage of Internet technology in scenario A in a business field.

[1 mark]

_____

(d) Internet Protocol version 4 (IPv4) is a widely used protocol for internet communication since the 1980s. It is used to identify and communicate with devices on the Internet. The explosive growth of the Internet's users is becoming an issue for IPv4.

(i) Explain how IPv6 can solve this problem in terms of addressing used.

[2 marks]

_____

_____

(ii) Give **one (1)** advantage of IPv6.

[1 mark]

_____

(e) **Figure 5** shows a conversation between two friends.

Figure 5

(i) As a friend, suggest **one (1)** domain name that is appropriate for Sephia's website.

[1 mark]

_____

(ii) What is a domain name?

[1 marks]

5.

(a) Azlina's startup company is growing and some other companies are trying to steal her innovative idea to make their own product. State **two (2)** importances of registering for a patent and trademark for a business.

[2 *marks*]

(b) Describe **one (1)** way to forgive others' mistakes while online.

[1 *mark*]

(c) Describe **one (1)** way to avoid online flame wars

[1 *mark*]

6.

(a) Company XYZ is a growing e-commerce business and they want to develop a mobile application to expand their business reach and improve customer engagement. The company realizes that a well-designed mobile app can enhance user experience, boost sales, and strengthen customer loyalty. Describe **one (1)** activity that happens during SDLC phase and **one (1)** deliverable for that phase. (Relate your answer with the scenario).

[6 *marks*]

SDLC Phases	**Activity**	**Deliverable**
Planning		
Design		
Implementation		

(b) Explain **one (1)** impact to Company XYZ if they fail to do the analysis phase of the System Development Life Cycle (SDLC).

[3 *marks*]

END OF QUESTION PAPER