

ANSWER ALL SEVEN QUESTIONS

QUESTION ONE

(Total: 30 marks)

Attempt all of the following. *Write down and show all your manual calculations in your exam book.*

- i. Convert the following numbers to Decimal (Base 10).
 - a. $(101101010)_2$ (4 marks)
 - b. $(AF09)_{16}$ (4 marks)
- ii. Convert the following numbers to Hexadecimal (Base 16).
 - a. $(17982)_{10}$ (4 marks)
 - b. $(7604)_8$ (4 marks)
- iii. Convert the following numbers to Binary (Base 2)
 - a. $(784)_{10}$ (4 marks)
 - b. $(F7A0)_{16}$ (3 marks)
- iv. Convert the following number to Octal (Base 8)
 - a. $(265)_{10}$ (4 marks)
 - b. $(87A0)_{16}$ (3 marks)

QUESTION TWO

(Total: 5 marks)

Categorise the following hardwares based on its usages into the following catagories:

- (a) CPU (b) Memory (c) Input device (d) Output device (e) Storage Device (f) Communication device

1. Mouse
2. Modem
3. Monitor
4. RAM
5. Webcam

QUESTION THREE

(Total: 5 marks)

Below is a list of **7 functions** and **5 computer components**.

Match the **best function** to each component.

Components

1. RAM
2. GPU
3. CPU

4. SSD
5. Motherboard

Functions

- A. Performs most of the main processing and execution of instructions
- B. Stores data permanently for fast access
- C. Connects and allows communication between all major hardware components
- D. Temporarily stores data and programs currently in use
- E. Handles graphics rendering and image/video processing
- F. Supplies power to the whole computer
- G. Cools down the system to prevent overheating

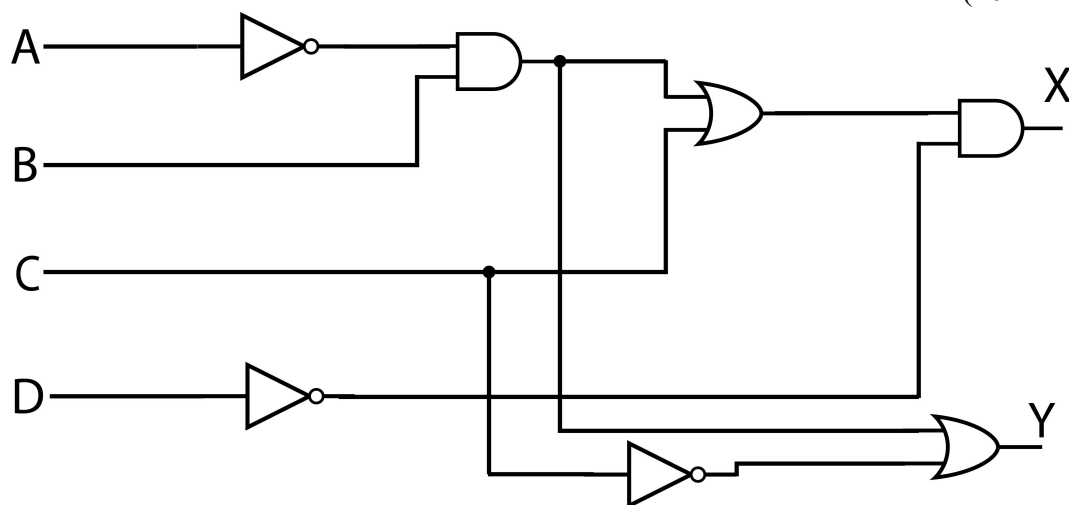
QUESTION FOUR

(Total: 20 marks)

- a. Draw a logical circuit from the given logical expression. Use only the basic logic gates (NOT, AND, OR) (10 marks)

$$X = \overline{A(B + C)} + C(\overline{AB + D})$$

- b. Derive the logical expressions for output X and Y of the following logic diagram. (10 marks)



QUESTION FIVE

(Total: 20 marks)

- a. Define RAID. State two characteristics and two benefits of RAID. (6 Marks)
- b. Describe RAID 1 with suitable diagram. (10 Marks)
- c. Define Data striping. Write 1 advantage and 1 disadvantage of RAID 0. (4 Marks)

QUESTION SIX

(Total: 10 marks)

Describe the general BUS system of a computer

- a. Draw the BUS connectivity Diagram showing data, address and control bus and their connection to CPU, Memory and input/output device. (5 Marks)
- b. Define Data, address and control bus. (5 Marks)

QUESTION SEVEN

(Total: 10 marks)

- a. Draw the diagram of Harvard architecture. (6 marks)
- b. Write 2 advantages of Harvard architecture. (2 marks)
- c. Write two difference between Harvard and Von Neumann architecture. (2 marks)