

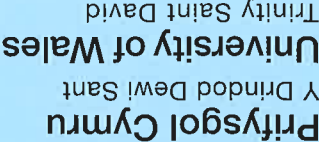


## 12 Pages

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners cannot be charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)



## 12 Tüdalen

1. Rhwch yr holl wybodaeth y gofynnir amdani yn y blychau isod.
2. Rhwch eich enw yn y lle a ddarparwyd ar y dde, plynwch et a'i sello i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.

3. Rhaid i'r atebion fod mewn llawysgriften ddarlennadwy. Gall yr Arholwyr naill ai anwybyddu sgript annarllennadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.
4. Ysgrifennwch eich atebion mewn inc.
5. Dechreuwch bob ateb ar dudalen newydd. Gwnewch unrhyw fras nodiadau yn y llyfr atebion a thynnu llinell drwyddynt.
6. Ni ddylid rhwgo unrhyw ran o'r llyfr hwn; rhaid ei gyflwyno yn gyfan.
7. Os defnyddir mwy nag un llyfr, rhwymwch hwy gyda'i gilydd gan ddefnyddio'r tagiau sydd ar gael oddi wrth y gwyllwyr/gwyliwyr.
8. Rhaid dychwelyd pob llyfr. Ni chaniateir mynd â llyfrau atebion, wedi eu defnyddio neu heb eu defnyddio, allan o'r lleoliad arholi o dan unrhyw amgylchriad.

[illegible]

(See the other side for English version)

Llenwch, plygwrch a selwch  
(gweler nodyn 2 isod)

**CYFENW:**

ENW(AU) CYNTAF:

Question one

I - Convert the following number to decimal

A - ~~(769)<sub>16</sub>~~  $(769)_{16}$  X

B - ~~(9A2)<sub>16</sub>~~  $(9A2)_{16}$  X

II -  $(87)_{10}$

B - 6

B -  $(5D9)_{16}$  X

Q3 -

Q4 1. use an OR gate for the output OR operation with inputs A and the result of the AND operation.

2 - For the AND operation, use an AND gate with inputs B and NOT C. To get NOT C use a NOT gate for input C.

3 - connect the output of the OR gate.

Q3 = A = CPU (central processing unit) -> processing device responsible for executing instructions in a computer program.

B = Memory = storage device - used to temporarily store data and instructions that the CPU needs during operation.

C = input device = used to input data into a computer system (e.g. keyboard, mouse).

D = output device = used to receive data from computer system (e.g. monitor, printer).

E = Storage Device = used for long term storage of data (e.g. hard drives, SSDs).

F = Communication Device = Facilitates communication between computer or other devices (e.g. network interface cards, modems).

Each category serves a distinct purpose into the overall functionality of the computer system.

1A 1011110001<sub>2</sub>

1B 10011010010<sub>2</sub>

11A 1010111<sub>2</sub>

-B 10111011001<sub>2</sub>

The process

1 - Decimal to Binary

Divide by 2. Record the remainder at the least significant bit.

2. Hexadecimal to Binary - Convert each hexadecimal digit to its 4 bits.

3. Binary to Decimal

$$\begin{aligned} \text{III } A &= 11101010001_2 \\ B &= 100001011100_2 \end{aligned}$$

$$\begin{aligned} \text{III } A &= 100001011100_2 \\ B &= 110111000_2 \end{aligned}$$

Q 19 = 1 - RAID provides Redundancy by distribution or replicating data across multiple drives:

This ensures that if one drive fails, the data can be recovered from other drives.

2 = performance improvement:

Depending on the RAID level there can be performance improvements through parallel access to multiple drives, enhancing read and write speeds.

Benefits

1. Data protection: RAID protects against data loss due to drive failures. Redundancy mechanisms ensure that data remains accessible even if a drive malfunctions.

2. Improved performance

B - RAID1 Description Diagram

RAID 1 also known as mirroring, involves duplicating across two drives

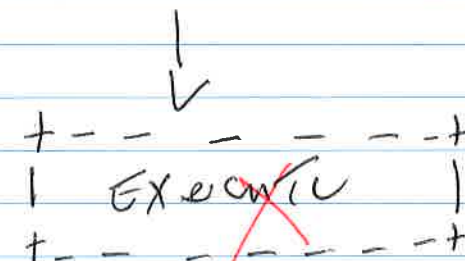
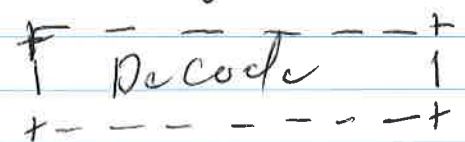
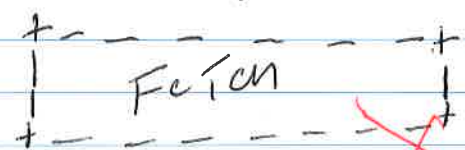
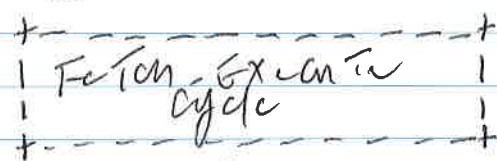


Advantage 1 - Redundancy and Data protection  
 The main advantage of RAID 1 is the robust data protection

Q5: Disadvantage

1 - Cost Efficiency RAID1 Requires double the storage capacity since data is duplicated. This makes it less cost efficient in terms of storage utilization compared to some other RAID configurations.

Q6 = (A) Fetch-Execute cycle Diagram



(B) Brief Description of each step  
 1 - Fetch The CPU fetches the next instruction from the memory address pointed to by the program counter. The program counter is incremented to point to the next instruction.

## Q26 - Decode

Decode - The fetched instruction is decoded to determine the operation to be performed and the operands involved.

The control unit interprets the instruction and prepares the CPU for execution.

## 3 - Execute

The decoded instruction is executed, which may involve arithmetic or logical operation, data transfers, or control flow execution may be stored in registers or memory, and the program counter is updated for the next instruction.

The Fetch-execute cycle is the fundamental process by which a CPU operates.

It repeats by which a CPU operates. It repeats continuously fetching and executing continuously.

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