

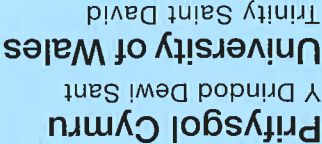


12 Pages

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or have it typed and the expense of typing 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 ef a'i seilio i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.

CYFENN:

Lienwch, plygwh a seliwh
(gweler nodyn 2 isod)

- Rhaid i'r atebion fod mewn llawysgrifen ddarlennadwy. Gall yr Arholiwr naill ai anwybyddu sgrifft annarllennadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.
- Ysgrifennwch eich atebion mewn inc.
- Dechreuwch bob ateb ar dudalen newydd. Gwnewch unrhyw fras nodiadau yn y llyfr atebion a thynnu llinell drwyddynt.
- Ni ddylid rhwgo unrhyw ran o'r llyfr hwn; rhaid ei gyflwyno yn gyfan.
- Os defnyddir mwy nag un llyfr, rhwymwch hwy gyda'i gilydd gan ddefnyddio'r tagiau sydd ar gael oddi wrth y gwyllwr/gwyliwr.
- 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]

7	Nifer y Llyfrau Atebion a gyflwynwyd	
6	Rhif Sedd	
5	Lleoliad yr Arholiad	
4	Dyddiad ac Amser yr Arholiad	
3	Cod y Modwl	
2	Teitl y Papur Arholiad	
1	Rhif Myfyrwr	

(See the other side for English version)

Question No.		Examiner Only		Question No.		Examiner Only	

QUESTION ONE

i

a. $(769)_{10}$ $(11000001)_2$

$$\begin{array}{r} 1 \overline{) 769} \ 2 \\ \underline{1 \ 384} \ 2 \\ 0 \overline{) 192} \ 2 \\ \underline{0 \ 96} \ 2 \\ \underline{0 \ 48} \ 2 \\ \underline{0 \ 24} \ 2 \\ \underline{0 \ 12} \ 2 \\ \underline{0 \ 6} \ 2 \\ \underline{1 \ 3} \ 2 \\ \underline{1 \ 1} \ 2 \\ \underline{1 \ 0} \ 2 \end{array}$$

b. $(9A2)_{16}$ $(100110100010)_2$

ii

a. $(87)_{10}$ $(127)_8$

$$\begin{array}{r} 7 \overline{) 87} \ 8 \\ \underline{7 \ 10} \ 8 \\ 2 \overline{) 1} \ 8 \\ \underline{1 \ 0} \ 8 \end{array}$$

b. $(5D9)_{16}$ $(010111011001)_2$ $(2731)_8$

iii

a. $(1110101001)_2$

$$1 \times 2^9 + 1 \times 2^8 + 1 \times 2^7 + 1 \times 2^5 + 1 \times 2^3 + 1 \times 2^0 =$$

$$512 + 256 + 128 + 32 + 8 + 1 = (937)_{10}$$

$$b. (50E)_{16}$$

$$5 \times 16^2 + 14 \times 16^0 =$$

$$1280 + 14 = (1294)_{10}$$

iv

$$a. (4278)_{10}$$

$$\begin{array}{r} 4278 \ 16 \\ 6 \overline{) 267} \ 16 \end{array}$$

$$(10B6)_{16}$$

$$\begin{array}{r} 11 \overline{) 16} \ 16 \\ 0 \overline{) 1} \ 16 \end{array}$$

$$\begin{array}{r} 1 \overline{) 0} \ 16 \end{array}$$

$$b. (670)_8$$

$$(110111000)_2$$

$$(1B8)_{16}$$

QUESTION TWO

1. RAM : B. MEMORY ✓
2. ETHERNET PORT : D. OUTPUT DEVICE ✗
3. MICROPHONE : C. INPUT DEVICE ✓
4. FLASH DRIVE : E. STORAGE ✓
5. GAMEPAD : C. INPUT DEVICE ✓

QUESTION THREE

$$\frac{50000}{2 \times 2.5 \times 10^9} s = \frac{50000}{5} \times 10^{-9} s$$

4.5

~~$$10000 \times 10^{-9} s$$~~

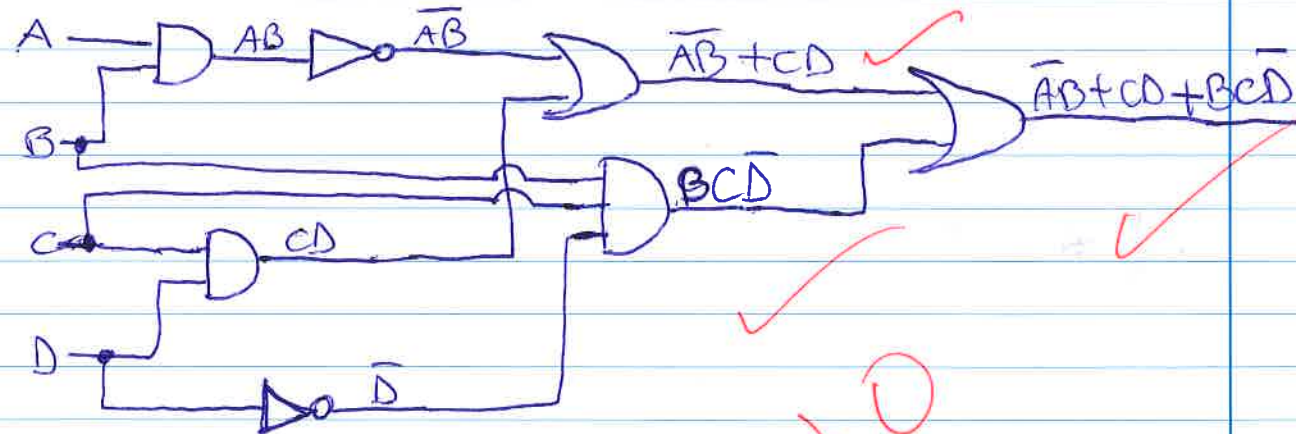
$$10000 \times 10^{-9} s$$

$$10 \times 10^{-6} s$$

$$10 \mu s$$

QUESTION FOUR

$$X = \overline{A}B + CD + BCD$$



6/5

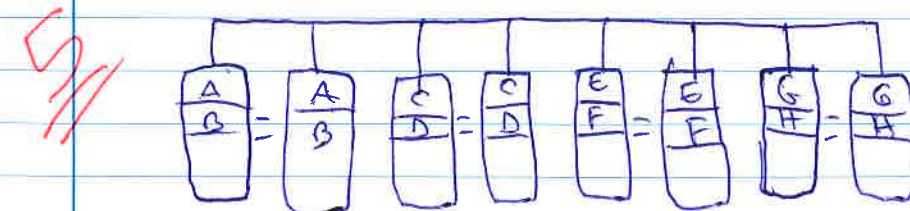
A	B	C	D	$\overline{A}B$	CD	~~BC~~	$\overline{B}C$	$\overline{D}$	$BC\overline{D}$	$\overline{A}B\overline{D}$	X
0	0	0	0	1	0		0	1	0	1	1
0	0	0	1	1	0		0	0	0	1	1
0	0	1	0	1	0		0	1	0	1	1
0	0	1	1	1	1		0	0	0	1	1
0	1	0	0	0	0		0	1	0	0	0
0	1	0	1	0	0		0	0	0	0	0
0	1	1	0	0	0		1	1	1	0	1
0	1	1	1	0	1		1	0	0	1	1
1	0	0	0	0	0		0	1	0	0	0
1	0	0	1	0	0		0	0	0	0	0
1	0	1	0	0	0		0	1	0	0	0
1	0	1	1	0	1		0	0	0	1	1
1	1	0	0	0	0		0	1	0	0	0
1	1	0	1	0	0		0	0	0	0	0
1	1	1	0	0	0		1	1	1	0	1
1	1	1	1	0	1		1	0	0	1	1

QUESTION FIVE

a. RAID (REDUNDANT ARRAY OF INDEPENDENT DISKS) IS USED TO STORE DATA AND ADD MEMORY STORAGE.

3/ THE BENEFITS ARE THE SPEED OF ACCESS TO THE DATA AND SECURITY AS IT FUNCTION AS A BACKUP.

b. RAID 1 DUPLICATES THE DATA IN TWO DISKS FOR EACH BLOCK OF DATA, A PROCESS CALLED DATA MIRRORING



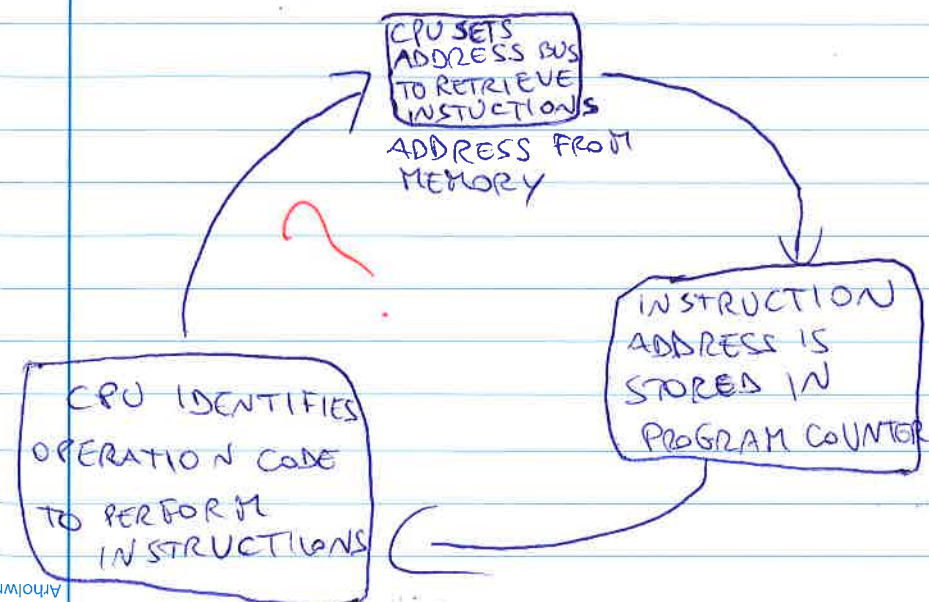
C ONE ADVANTAGE OF RAID 1 IS SECURITY, AS IF ONE DISK GETS CORRUPTED, THE OTHER ONE TAKES OVER, MINIMISING THE RISK OF DATA LOSS

ONE DISADVANTAGE IS THE COST AS IT NEEDS MORE DISKS

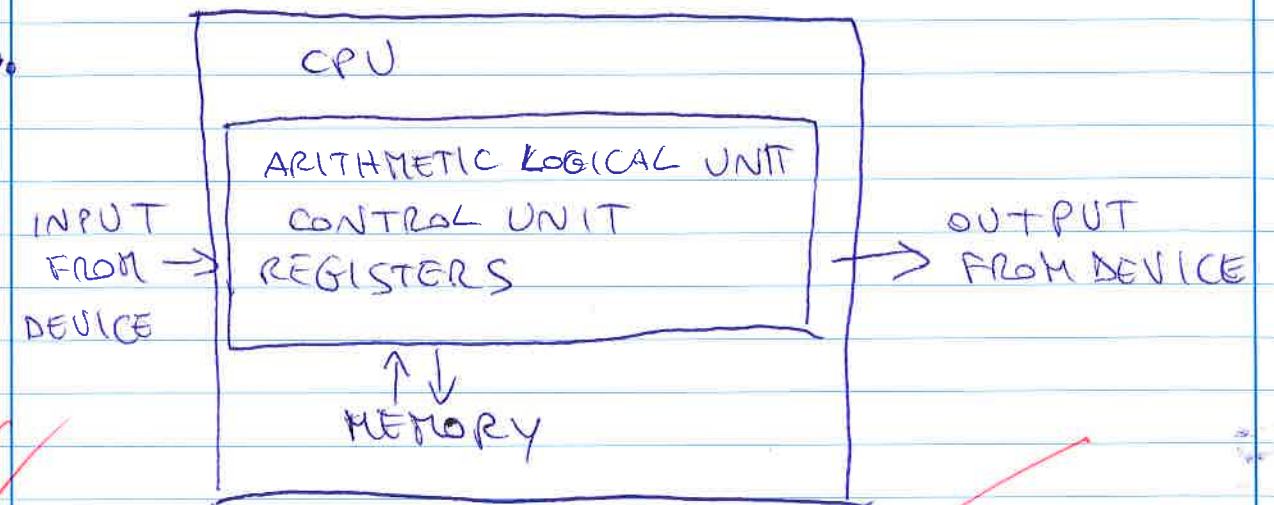
QUESTION SIX

CPU FETCHES BINARY INSTRUCTIONS FROM A MEMORY ADDRESS UTILISING ADDRESS BUS. THE INSTRUCTIONS ARE STORED IN THE INSTRUCTION REGISTER IN THE CPU AND A REGISTER CALLED PROGRAM COUNTER ~~KEEPS~~ TRACK OF THE INSTRUCTION MEMORY ADDRESS AND UPDATES AFTER EVERY FETCH SO THAT THE CPU KNOWS ~~WHICH~~ WHICH IS THE NEXT INSTRUCTION TO BE EXECUTED.

THE ~~CPU~~ ^{CPU} ~~UNIT~~ THEN IDENTIFIES THE OPERATION CODE TO UNDERSTAND WHICH INSTRUCTIONS TO EXECUTE AND CONNECTS THE CONTROL UNIT WITH OTHER PARTS OF CPU NEEDED FOR THE REQUESTED OPERATION.



QUESTION SEVEN



b. ONE ADVANTAGE OF VON NEUMANN ARCHITECTURE IS THAT OFFERS PROGRAMMERS MORE CONTROL OVER MEMORY ORGANISATION, AS INSTRUCTIONS AND DATA ARE STORED IN THE SAME MEMORY UNIT.

SECOND ADVANTAGE IS THE COST, AS THERE ~~IS~~ IS ONLY ONE BUS FOR INSTRUCTION FETCH AND DATA TRANSFER THEREFORE IS CHEAPER TO MANUFACTURE.

c. ONE DISADVANTAGE IS SECURITY BECAUSE IF THERE IS AN ERROR IN A PROGRAM IT CAN CAUSE DATA LOSS.

SECOND DISADVANTAGE IS THE SPEED, USING ONLY ONE BUS FOR DATA AND INSTRUCTIONS (SEQUENTIAL PROCESSING) IT CANNOT FETCH INSTRUCTIONS AND TRANSFER DATA AT THE SAME TIME.