Question 1

(a) {One mark each}

C – Register
E – Read Only Memory
F – Secondary
G – Data
H – Address
X – Input

(b) Control Unit functions: {Any two to score 2 marks}

- Follows instructions and decides WHEN data should be stored, received or transmitted by different parts of the computer.
- It makes sure that data is transported to WHERE it needs to be.
- Makes sure the data is processed in the correct order.

(c) $2^{64} / 2^{32} = 2^{64-32} = 2^{32}$

4,294,967,296 times or 4 billion times {accept both answers. Both answer and working correct to score 2 marks, otherwise zero}

Question 2

Inputs:
Name of the road
Estimated duration
Start Time
End Time
{*All **four** identified for 2 marks, deduct a mark for every omission or mistake*}

Output:
Monetary amount that was deducted
{1 mark}

Process:
Calculate the amount owed using the parking duration referenced against a parking rate table.
Deduct the amount from the motorist's credit card
{*All **two** identified for 2 marks, deduct a mark for every omission or mistake*}

Question 3

(a) Trace Table Completion: {All 6 columns correct to score 5 marks, deduct a mark for each incorrect column}

x	y	t	x odd?	x = 0?	OUTPUT
3	7				
		0			
			Y		
2	7	7			
				N	
1	14	7			
			Y		
0	14				
		21			
				Y	
					21

x	y	t	x odd?	x = 0?	OUTPUT
12	15				
		0			
			N		
				N	
6	30	0			
			N		
				N	
3	60	0			
			Y		
2	60	60			
				N	
1	120	60			
			Y		
0	120				
		180			
				Y	
					180

(b) The algorithm gives the answer for x multiplied by y. {1 mark}

(c) The algorithm uses doubling and halving, to perform multiplication. {1 mark}
There is no need to use multiplication tables to perform multiplication. {1 mark}

Question 4

i. It is a data type used to represent text as a sequence of characters or symbols.
{both concepts present to award 1 mark}

ii. name = 'Alison' OR name = "Alison"
{no typo allowed} {Award 1 mark for correctly written line}

iii. It is the process of converting a value from one data type to another
{Award 1 mark for correct definition}

iv. It is a data type for storing multiple values in a sequence.
{Award 1 mark for correct definition}

v. It is where all the items have the same data type / size and are arranged consecutively in memory.
{Award 1 mark for correct definition}

Question 5

(a) It is a code translator program that translates source code into machine code completely before running the compiled program.
{1 mark for complete description}

(b) It is a code translator program that translates source code into machine code while the interpreted program is running.
{1 mark for complete description}

{1 mark per box for complete desription}

<table>
<tr><th></th><th>Compilers</th><th>Interpreters</th></tr>
<tr><td rowspan="3">Describe two Advantages

{Any two}</td><td>Resulting program runs at a faster speed because all the translation has been done beforehand.</td><td>Changes to the source take effect immediately.</td></tr>
<tr><td>The compiler is not needed to run the program after compilation is complete</td><td rowspan="2">Interpreters usually offer an interactive mode, which facilitates learning and experimentation.</td></tr>
<tr><td>Syntax errors are detected before the program is even run.</td></tr>
<tr><td rowspan="3">Describe two Disadvantages

{Any two}</td><td>Any changes to the source code require recompilation before taking effect.</td><td>The resulting program runs at a slower speed because translation occurs while the program is running.</td></tr>
<tr><td rowspan="2">Compilers usually do not offer an interactive mode.</td><td>The interpreter needs to be run every time the program is started.</td></tr>
<tr><td>Syntax errors may interrupt the running of a program.</td></tr>
</table>

Question 6

Type of **Test Condition**	**Two** examples of input test data	
NORMAL	1 - 9	Numeric 1 to 9, {any two}
BOUNDARY	1, 9, 0, 10	{any two}
ERROR	0, 10, -ve, char, blank, >9	{any two}
All correct to score 6 marks. -1 for each mistake or omission.		

Question 7

{1 mark per box. Preventive measure MUST address Scenario}
{Power Failure scenario MUST include both points to score 1 mark}

Cause	Scenario	Preventive measure
Human error	Storage devices may be accidentally damaged during transport. OR Multiple users working on the same file may accidentally overwrite each other's data.	Use adequate protection when transporting storage devices. OR Set up rules when collaborating with multiple users to prevent them from writing to the same file at the same time.
Power failure	If power supply to computer fails, data that is the process of being written to a storage device may become corrupted and data that is stored in volatile memory but not yet written to storage device will be lost.	Set up a backup power supply or UPS.

{1 mark each. Penalty for spelling mistakes}
online stronger report intercepted

Question 8

{Working and Answer MUST be correct to earn 1 mark}

10010011 -> *from the table* -> 93_{16}

{All three points to earn 2 marks, deduct 1 mark for every missing point}

HEX is a short form for BIN;

Use less space;

HEX easier to read than BIN;

{ Any three points to earn 3 marks}

HLL easier to learn;

HLL has development tools making it easier to develop/debug programs;

HLL developed programs can run on different platforms;

HLL expresses abstraction – easier to think in terms of variables, arrays, functions than registers, memory addresses.

HLL produces shorter code – "Hello World" program vs LLL version.

{must address this area to earn 1 mark}

LLL for specialized/embedded systems for efficiency and mission critical applications.

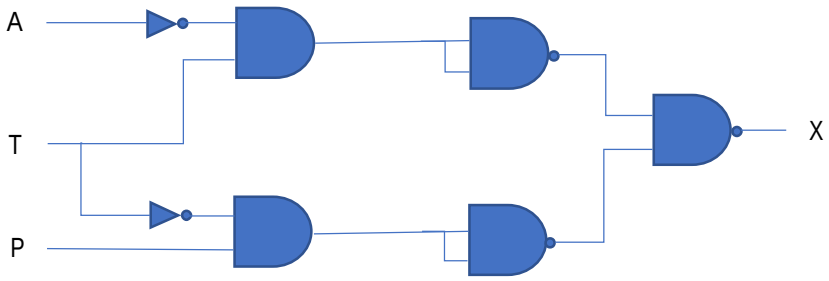
Question 9

(a) X = (P AND NOT T) OR (T AND NOT A) {Exact to score 1 point}

(b) {mark by row, all correct to score 2 points, deduct a point for every mistaken column}

A	T	P	X
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

(c) {Exact to score 4 points, deduct a point for every mistake, Beware the NAND gates combo!}



Question 10
(a) MAX
(b) SUM
(c) = F4 – G4
(d) C2:D6, F2:H6, D8, H8

Question 11
(a) A client computer initiates a connection to a server to request for resources and services to perform operations. {both points to score 1 mark}

(b) A server computer shares resources and responds to requests from devices and other servers on the network. {both points to score 1 mark}

(c) The server has higher capacity and has more powerful processing capabilities than a client as it needs to manage the resources and services. {both points to score 1 mark}

(d) {1 mark per point}
- Provide central storage of files
- Share hardware such as printers
- Control logins and network access

(e) {1 mark per box, with key points stated in each box}

Feature	Client-server	Peer-to-Peer
Security	High as access rights can be controlled centrally at a server.	Low as security is handled by each computer and not by a central server.
Application (where can it be found)	Found in businesses or organisations with a large number of users.	Found in homes or small businesses where there are fewer users.

TABLE OF SPECIFICATIONS

Table of Specifications				
Question	**Topic**	**Knowledge**	**Comprehension**	**Application**
1	Computer Architecture	6	2	2
2	Algorithms for Problem Solving			5
3	Flowcharts and Trace Tables		5	3
4	Data Types	3	2	
5	Program Development	2	8	
6	Data Validation, Test Cases, Debug	3	3	
7	Safe and Responsible User	4	4	
8	Number Systems, Programming Lang	1	3	3
9	Logic Circuits, Truth Tables, Gates			7
10	Data Management with Spreadsheets		4	
11	Computer Networking	5	1	4
	Sub-Total	24	32	24
	Marks %	30%	40%	30%