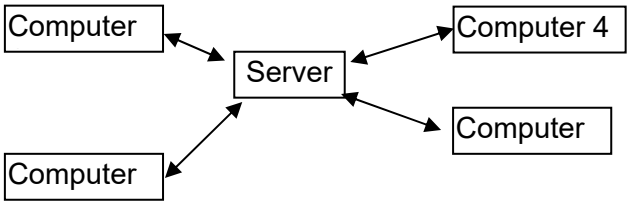
Question	Answer	Marks
1(a)	**1 mark** each to **max 2** • Allows the sharing of files/data // Allows communication between the devices • Allows the sharing of resources e.g. hardware / software (applications) • Allows central management // by example, backup, security, etc.	**2**
1(b)	**1 mark** each to **max 2** • Covers a small geographical area • The infrastructure is privately owned // not controlled by external organisations	**2**
1(c)	**1 mark** each to **max 2** • Each computer directly connected only to the server ... • ... <u>all</u> components correctly labelled  	**2**
1(d)	**1 mark** each to **max 3** • A protocol (suite) • For **data transmission** over standard / universal **wired** / **cabled** network connections • Uses Carrier Sense Multiple Access / Collision Detection (CSMA/CD) • Data is transmitted in frames • … each frame has a source and destination (IP/MAC) address • ... and error checking data (so damaged frames can be resent)	**3**
1(e)	**1 mark** each • The server performs **minimal** / **some processing** for the client • The clients also do **most** of their own processing/work independently // most of the resources are installed locally	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>1 mark for each correct feature or description

<table>
<tr><th>Feature</th><th>Description</th></tr>
<tr><td>Data dictionary</td><td>Data about the data in the database // data about the structure of the database // metadata for a database</td></tr>
<tr><td>Query processor</td><td>Software that allows the user to enter criteria, then finds and returns the appropriate result // software that processes and executes queries written in SQL</td></tr>
<tr><td><u>Logical schema</u></td><td>A model of a database that is not specific to one DBMS</td></tr>
<tr><td><u>Developer interface</u></td><td>A software tool that allows the user to create items such as tables, forms and reports</td></tr>
</table></td><td>4</td></tr>
<tr><td>2(b)</td><td>1 mark each to max 3

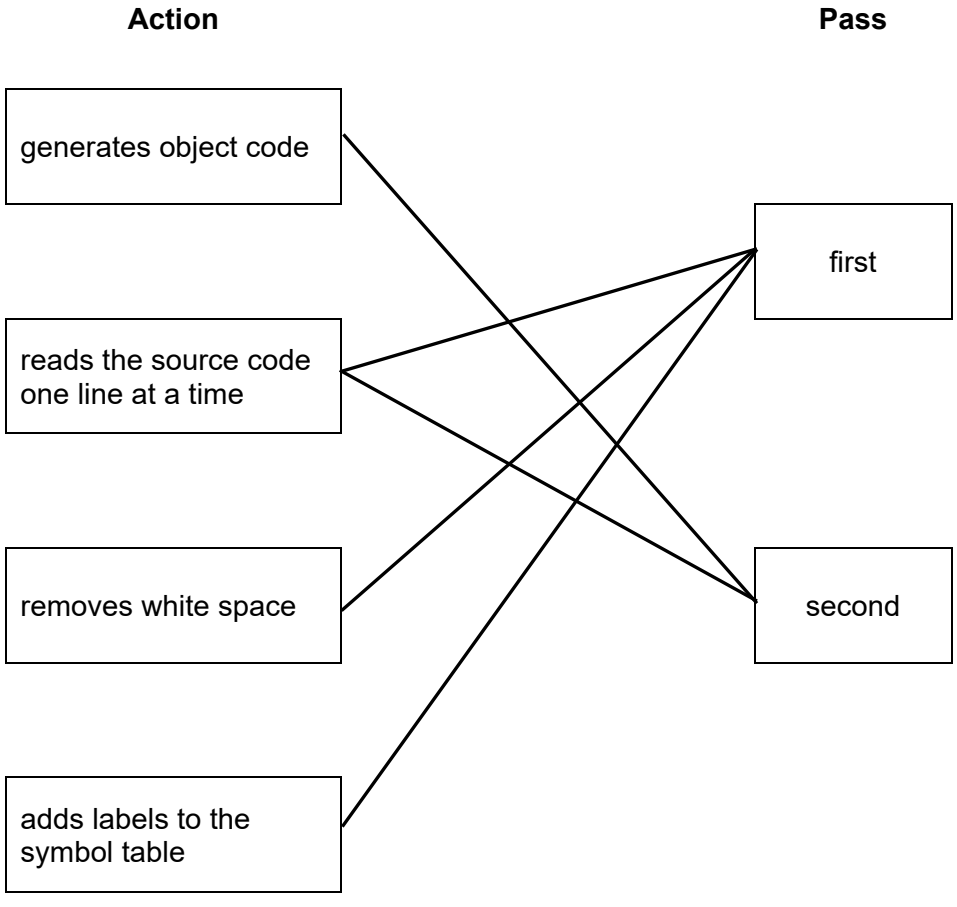
• Referential Integrity makes sure data is consistent
• Referential Integrity makes sure all data is up-to-date
• Referential integrity ensures that every foreign key has a corresponding primary key
• Referential Integrity prevents records from being added / deleted / modified incorrectly
• Referential Integrity makes sure that if data is changed in one place the change is reflected in all related records
• Referential Integrity makes sure any queries return accurate and complete results</td><td>3</td></tr>
<tr><td>2(c)(i)</td><td>1 mark each to max 2

• Presence check to make sure that the (rider level) is entered
• Look-up / Existence check to make sure the rider level is only Beginner, Intermediate or Advanced
• Length check to make sure the rider level entered is either 8 or 12 characters
• Type check to make sure the rider level is alphanumeric</td><td>2</td></tr>
</table>

Question	Answer	Marks

2(c)(ii)	**1 mark** each
	
	• SELECT field Name
	• FROM table HORSE
	• WHERE with Intermediate / Beginner
	• OR with Beginner / Intermediate
	
	Example answer:
	`SELECT Name`
	`FROM HORSE`
	`WHERE HorseLevel = "Intermediate"`
	`OR HorseLevel = "Beginner";`
		4

2(c)(iii)	**1 mark** each • SUM should be COUNT // SELECT COUNT(STUDENT.RiderLevel) • The WHERE statement needs the table names before each field name // WHERE STUDENT.StudentID = LESSON.StudentID • The OR should be AND // AND Date = #09/09/2023# • Beginner is missing the speech marks // STUDENT.RiderLevel = "Beginner";	**4**

Question	Answer	Marks
3(a)	**1 mark** for generates object code to second pass **1 mark** for reads source code one line at a time to both boxes **1 mark** for removes white space and adds labels to first pass 	**3**
3(b)	**1 mark** for each correct term **Direct** addressing is when the operand holds the memory address of the data. **Indirect** addressing is when the operand holds a memory address that stores the memory address of the data. **Immediate** addressing is when the operand is the data.	**3**

Question	Answer	Marks
4(a)	2^{16} // 65536	**1**
4(b)	**1 mark** for working; **1 mark** for answer • Working: +120 = 0111 1000 • Answer: 1000 0111	**2**

Question	Answer	Marks

4(c)	**1 mark** for working; **1 mark** for answer
	
	• Working: A04 = (10 * 16^2) + 4
	// A04 = (10 * 256) + 4
	// A04 = 1010 0000 0100
	
	• Answer: 2564
		2

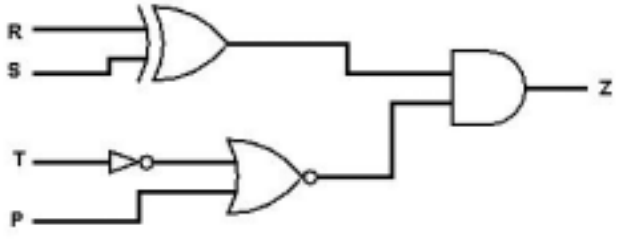
4(d)	0011 1100	**1**

Question	Answer	Marks
5(a)	**1 mark** each to **max 2** Examples: • Interrupt • Timing • Read • Write	**2**
5(b)	**1 mark** for description; **1 mark** for corresponding explanation Examples • Increase number of cores • Each core can **independently** carry out a process at the same time // so that more instructions are performed **in parallel** • Increase RAM capacity • ... allowing more applications to reside in memory at the same time, saving disk access times • Increase cache memory • More data can be stored in fast access so less time is spent accessing from RAM • Increase clock speed • More Fetch-Decode-Execute (FDE) cycles can run each second / **per unit time**	**4**
5(c)(i)	**1 mark** for a correct answer • 1 bit is transferred at a time • Can be synchronous **or** asynchronous • USB-3 is full duplex **and** earlier versions are half-duplex	**1**
5(c)(ii)	**1 mark** for identification of a suitable port Examples • HDMI • DisplayPort	**1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(d)(i)</td><td>1 mark each to max 5

• Manages the scheduling of processes // decides which order to run processes
• Manages which resources the processes require
• … such as allocating memory
• Enables processes to share data
• Prevents interference between processes // resolution of conflicts
• Handles the process queue
• It allows multi-tasking / multi-processing
• ... by ensuring fair access, handling priorities and handling interrupts</td><td>5</td></tr>
<tr><td>5(d)(ii)</td><td>1 mark each to max 2

• To help users to set-up / configure / analyse / optimise / maintain the computer ...
• ... by for example, making memory allocation more efficient
• ... by for example, checking the system for faults</td><td>2</td></tr>
<tr><td>6(a)</td><td>1 mark for correct XOR and AND gates, with correct inputs
1 mark for correct NOT and NOR gates with correct inputs

 
</td><td>2</td></tr>
<tr><td>6(b)</td><td>1 mark for first 4 rows
1 mark for last 4 rows

<table>
<tr><th>P</th><th>Q</th><th>R</th><th>Working space</th><th>Z</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td></td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td></td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td></td><td>1</td></tr>
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<tr><td>1</td><td>1</td><td>0</td><td></td><td>1</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td></td><td>1</td></tr>
</table></td><td>2</td></tr>
</table>

Question	Answer	Marks
7(a)(i)	**1 mark** each to max 2 • Set of pre-written / pre-compiled / pre-tested subroutines • ... which can be **called** in other programs • ... by **installing/importing** the library	**2**
7(a)(ii)	**1 mark** for each bullet point. Mark in pairs; **1 mark** for a benefit and **1 mark** for an appropriate expansion • (main) memory requirements for program is reduced • ... as dynamic link library is loaded only once / when required • the executable file size of the program using the DLL will be smaller • ... because the executable does not contain (all) the library routines • maintenance not needed to be done by the programmer • ... because the DLL is separate from program • no need to **recompile** the main program when changes are made to DLL • ... because changes / improvements/ error correction to the DLL file code are done independently of the main program • A single DLL file can be made available to several application programs • ... Saving space in memory / easing the pressure on memory	**4**
7(b)	No mark for choice. **1 mark** each to **max 3** for justification Interpreter • Allows the developer to make real-time changes • … so the program can be debugged **at each stage** • ... the effect of any changes made by the developer can be seen immediately • The developer can test when incomplete • … so small parts can be tested without having to test the rest of the program • … if one section does not work others can still be tested • To avoid dependent errors Compiler • The developer can debug multiple errors simultaneously • Produces an executable file • … so that the developer can test the program multiple times without recompiling	**3**

Question	Answer	Marks
7(c)	**1 mark** each Breakpoints: • **Stop the code** at a specific line to check the current progress / values Dynamic syntax checks: • Highlight / underline / colour syntax errors **as the code is entered** Context-sensitive prompts: • Suggest the code to add // automatically complete statements Single stepping: • Run the code **one line at a time** so the values can be checked	**4**
7(d)	**1 mark** each to **max 3** • Uses speech recognition • ... which identifies key phrases / words spoken • … and matches these to a database • ... and generates the most likely sentence / command / word	**3**