COMPUTER SCIENCE **9608/12**

Paper 1 Written Paper **May/June 2017**

MARK SCHEME

Maximum Mark: 75

Published

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This document consists of **7** printed pages.

Question	Answer	Marks
1(a)	Many-to-many relationship	**1**
1(b)(i)	Both entities correctly labelled 1 Correct relationship between SHOP and SHOP-SUPPLIER 1 Correct relationship between SUPPLIER and SHOP-SUPPLIER 1	**3**

1(b)(ii)

Table	Primary key	Foreign keys(s) (if any)	Explanation
SHOP	ShopID	None	
SUPPLIER	SupplierID	None	
SHOP-SUPPLIER	ShopID **AND** SupplierID	ShopID **OR** SupplierID (or both)	To create a link with the SHOP or SUPPLIER table.

- SHOP has primary key ShopID and SUPPLIER has primary key SupplierID   1
- SHOP-SUPPLIER has primary key ShopID + SupplierID   1
- Both SHOP and SUPPLIER show foreign key as 'None'   1
- SHOP-SUPPLIER shows foreign key ShopID or SupplierID   1
- Explanation for SHOP-SUPPLIER foreign key describes ShopID or SupplierID creating a link   1

Marks: **5**

Question	Answer	Marks
1(b)(iii)	**Two** from: • The database user will <u>frequently</u> want to search on contact name 1 • The contact name attribute has been indexed 1 • It allows for a <u>fast/faster</u> search using contact name 1	**Max 2**
1(c)(i)	`SELECT ShopID, Location` 1 `FROM SHOP` 1 `WHERE RetailSpecialism = 'GROCERY';` 1	**3**
1(c)(ii)	`INSERT INTO SHOP-SUPPLIER` 1 `(ShopID, SupplierID)` 1 `VALUES (8765, 'SUP89');` 1	**3**

Question	Answer	Marks
2(a)	**One** mark for each pair of rows	**2**

		Type of printer	
		Laser	Inkjet
	Impact printer		
	Non-impact printer	✔	✔
	Line printer		✔
	Page printer	✔	

Non-impact printer / Line printer pairs: **1**, **1**

Question	Answer	Marks
2(b)(i)	**Five** from: • The print head contains a large number of very small nozzle**s** 1 • Ink is fed to each nozzle from a reservoir 1 • The print head fires <u>droplets</u> of ink onto the paper 1 • The print head moves horizontally across the paper 1 **Either:** • Tiny resistors create heat inside each nozzle 1 • The heat vaporises ink to create a bubble 1 • When the bubble pops the ink is deposited on the page 1 • The collapsing bubble creates a partial vacuum in the nozzle 1 • And ink is drawn from the reservoir ready for printing the next dot 1 **Or:** • There is a piezo crystal at the back of the ink reservoir of each nozzle 1 • The crystal vibrates when it receives a tiny electric charge 1 • Ink is forced out of the nozzle by the inward vibration 1 • The outward vibration creates a partial vacuum in the nozzle 1 • Replacement ink is pulled into the reservoir 1	**Max 5**
2(b)(ii)	**Two** from: • The (print head) stepper motor is connected to the print head by a belt 1 • The (print head) stepper motor moves the print head across the paper 1 • The (parking) stepper motor parks the print head assembly when not in use 1 • The (paper feed)stepper motor turns the rollers that provide the paper feed // The (paper feed)stepper motor moves the paper in small increments 1	**Max 2**
2(c)(i)	**Two** from: • External hard drive // External HDD 1 • External flash drive // External SSD 1 • Pen drive 1	**Max 2**

Question	Answer		Marks
2(c)(ii)	**One** from: *(External) Hard drive* Inexpensive per unit of storage Lar<u>ger</u> storage capacity than flash drive **Or:** *Pen drive // (External) flash drive* No moving parts / noise Low latency // fast access times Robust	 1 1 1 1 1	**Max 1**

Question	Answer		Marks
3(a)	*Definition*: **Max two** from: • The number of distinct values available to encode/represent each sample • Specified by the number of bits used to encode the data for one sample • Sometimes referred to as bit depth *Explanation:* **Max two** from: • A larger sampling resolution will mean there are more values available to store each sample • A larger sampling resolution will improve the accuracy of the digitised sound // A larger sampling resolution will decrease the distortion of the sound • Increased sampling resolution means a smaller quantization error	 1 1 1 1 1 1	**Max 3**
3(b)(i)	**One** from: • The <u>number of pixels</u> per <u>unit measurement</u> • The number of pixels in an image • The number of pixels wide by the number of pixels high • Number of pixels per row by the number of rows	 1 1 1 1	**1**
3(b)(ii)	4		**1**
3(b)(iii)	*Working*: **Max two** from: • Number of pixels is 8192 × 256 • One pixel will be stored as one byte • Number of kilobytes = (8192 × 256) / 1024 *Answer:* **One** mark: Number of kilobytes = 2048 KB	 1 1 1 1	**3**
3(b)(iv)	**Two** from: • Confirmation that the file is a BMP • File size • Location/offset of image data within the file • Dimensions of the image (in pixels) // image resolution • Colour depth (bits per pixel, 1, 4, 8, 16, 24 or 32) • Type of compression used, if any	 1 1 1 1 1 1	**Max 2**

Question	Answer	Marks
4(a)(i)	**Two** from: • The hardware is unusable without an OS // hides complexity of hardware from user 1 • Acts as an interface/ controls communications between user and hardware / hardware and software // or by example 1 • Provides software <u>platform / environment</u> on which other programs can be run 1	**2**
4(a)(ii)	**One** mark for the name and **one** mark for description. **Max two** management tasks. • Provides the Human Computer Interface (HCI) 1 Controls communications between user and hardware// or by example 1 • Main memory management 1 Memory protection to ensure that two programs do not try to use the same space // Use of virtual memory // Location of processes within the memory // By example 1 • File / Secondary storage management 1 Maintains directory structures // Provides file naming conventions // Controls access 1 • Peripheral / hardware / device / Input-Output management 1 Installation of appropriate driver software // Controls access to data being sent to/from hardware/peripherals // Controls access to hardware/peripherals // manages communication between devices. 1 • Interrupt handling 1 Identifies priorities of interrupts // Saves data on power outage // Loads appropriate Interrupt Service Routine (ISR) // By example 1 • Security management 1 Makes provision for recovery when data is lost // Provides usernames and passwords // Prevents unauthorised access // Ensures privacy of data 1	**Max 4**
4(b)(i)	File compression software	**1**
4(b)(ii)	Backup software	**1**
4(b)(iii)	Disk defragmenting software	**1**
4(b)(iv)	Anti-virus software	**1**

Question	Answer	Marks
5(a)(i)	351	**1**
5(a)(ii)	355	**1**
5(a)(iii)	22	**1**

Question	Answer	Marks
5(a)(iv)	86	**1**

5(b)	**Op code** **Operand**
	
	 `0 0 0 1 0 0 1 0` `0 1 0 0 0 0 1 1`
	
	 `0 0 0 1 0 1 0 1` `0 0 0 0 0 1 1 1`
	
	 Both correct op codes 1
	 Operand `0100 0011` 1
	 Operand `0000 0111` 1
		3

5(c)(i)	`14 5E` `14` 1 `5E` 1	**2**
5(c)(ii)	`LDR #77` `LDR` 1 `#77` 1	**2**

Question	Answer		Marks
6(a)	**Two** from: • The <u>file</u> is made available from a web/email/FTP server • The user's <u>browser</u> is the client software • The client (software browser) <u>requests</u> the <u>file</u> from the server • The desired <u>file</u> is returned to the client computer	1 1 1 1	**Max 2**
6(b)	1. The user keys in the Uniform Resource Locator (URL) into the browser Software.		**4**
	2. **E** // The Domain Name Service (DNS) uses the domain name from the browser to look up the IP address of the web server.	1	
	3. **D** // The web server retrieves the page	1	
	4. **F** // Sends the web page content to the browser	1	
	5. **B** // Browser software renders the page and displays	1	
6(c)(i)	`Output1, Output2` `RunnerID` **//** Runner ID	1 1	**2**
6(c)(ii)	6 – 21		**1**
6(c)(iii)	13		**1**
6(c)(iv)	Checks that the `RunnerID` entered starts with the characters CAM or VAR only		**1**
6(c)(v)	**Two** checks from: **One** mark for check and **one** mark for description • Format check `RunnerID` is three letter characters followed by two digit characters //`Position` is digit characters only • Length check `RunnerID` has exactly five characters • Range check The value for `Position` is between1 and (say) 50 • Presence check The text box for `RunnerID` or `Position` is not empty • Existence check To ensure that `RunnerID` has been registered • Uniqueness check To ensure no two runners have the same number	 1 1 1 1 1 1 1 1 1 1 1 1	**Max 4**