IGCSE Cambridge Topical Past Papers

COMPUTER SCIENCE 9-1

0984 Paper 1

2020 — 2025

EXAMINENT

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1 - (0984/12_Summer_2020_Q7)

(a) Give the **denary** value of each of the three 12-bit binary values.

(i) 000000001100

..... [1]

(ii) 000011000110

..... [1]

(iii) 010011000001

..... [1]

Working space

(b) 12-bit binary values can also be represented as hexadecimal values.

Give the **hexadecimal** value of the 12-bit binary value.

000011101001

..... [3]

2 - (0984/12_Winter_2020_Q1)

Tina is creating a website for charity events. She uses HTML to create the website.

(a) State what is meant by HTML.

.....

..... [1]

(b) She uses the hexadecimal colour code #43B7F0 as the background colour for her website.

(i) State whether background colour is an example of **structure** or **presentation**, in the website.

..... [1]

(ii) The hexadecimal colour code #**43B7F0** is stored in three **8-bit** registers.

Give the **8-bit binary** values for each part of the hexadecimal code.

43								
B7								
F0								

[6]

(c) Tina uses a microphone to record a welcome message for her website.

(i) State whether the microphone is an **input** or **output** device.

..... [1]

(ii) She wants to compress the recording to make sure that the file is as small as possible for the website.

Identify which type of compression she should use and describe how this would compress the file for the website.

Type of compression .....

Description

..... [4]

(iii) Give **two** benefits of compressing the file for the website.

Benefit 1 .....

.....

Benefit 2 .....

.....

[2]

(d) Tina will use the TLS protocol in her website when selling tickets to people for different charity events. This makes sure that their personal data is transmitted securely.

(i) Identify the **two** layers that are present in the TLS protocol.

Layer 1 .....

Layer 2 .....
[2]

(ii) Explain how data is sent securely using the TLS protocol.

..... [6]

(e) Tina is concerned about security threats to her web server.

(i) Identify **three** security threats to her web server that Tina might be concerned about.

1 .....

2 .....

3 .....
[3]

(ii) Tina installs a proxy server to help protect her website from security threats.

Describe how the proxy server will help protect the website.

..... [4]

3 - (0984/12_Winter_2020_Q2)

Four 7-bit binary values are transmitted from one computer to another. A parity bit was added to each binary value creating 8-bit binary values. All the binary values have been transmitted correctly.

(a) Tick (✓) to show whether an **Even** or an **Odd** parity check has been used for each binary value.

8-bit binary value	Even (✓)	Odd (✓)
11111111		
01100110		
01111011		
10000000		

[4]

(b) The data will also be checked using a checksum.

Describe how a checksum can be used to check that the data has been transmitted correctly.

..... [5]

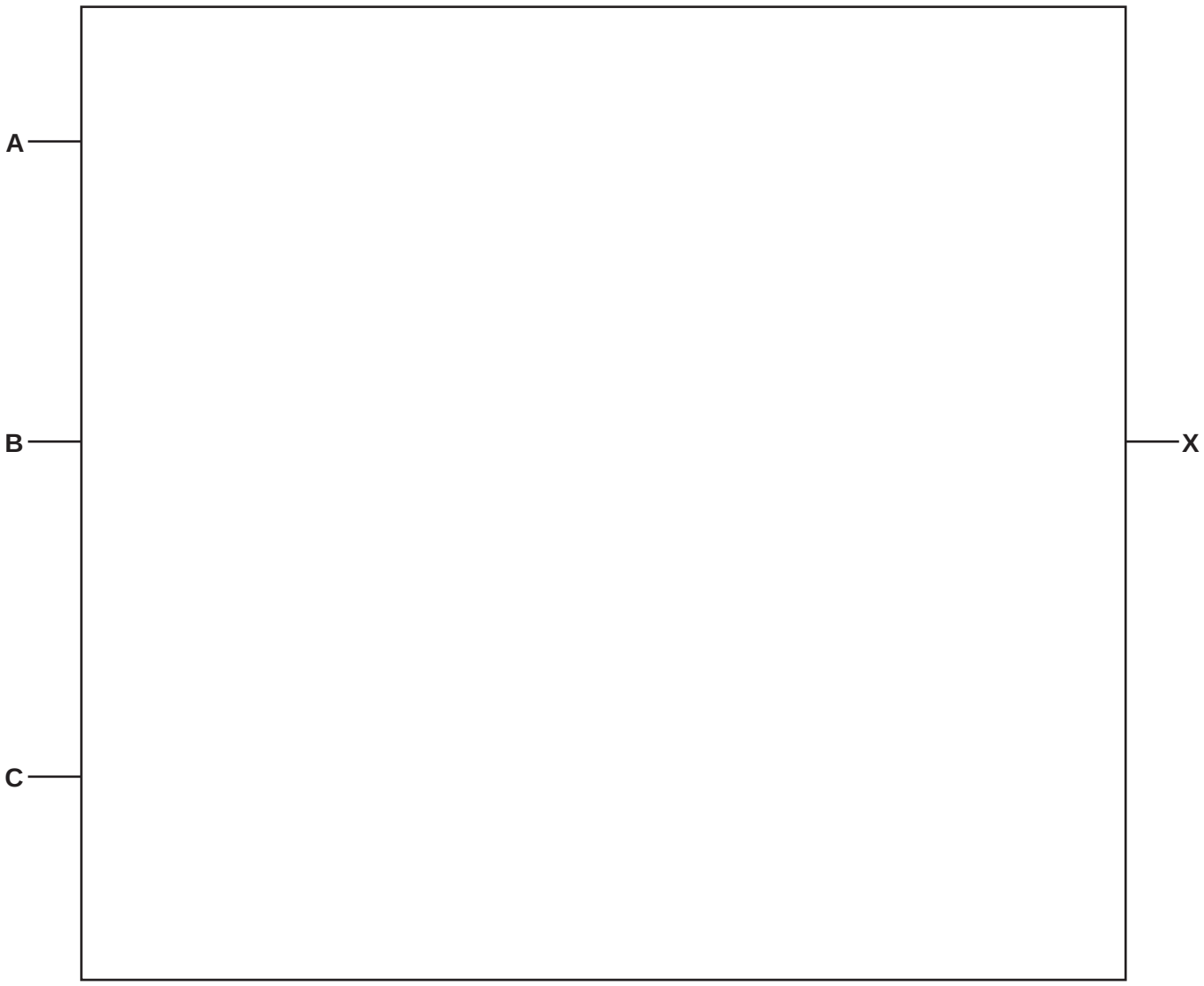
4 - (0984/11_Summer_2021_Q6)

Consider the logic statement:

X = (((**A** AND **B**) OR (**C** AND NOT **B**)) XOR NOT **C**)

(a) Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the statement. All logic gates must have a maximum of two inputs.



[6]

(b) Consider the completed truth table for the given logic statement.

Row number	**A**	**B**	**C**	Working space	**X**
1	0	0	0		**0**
2	0	0	1		**1**
3	0	1	0		**0**
4	0	1	1		**1**
5	1	0	0		**0**
6	1	0	1		**1**
7	1	1	0		**0**
8	1	1	1		**1**

There are four errors in the truth table in the output (X) column.

Identify the **four** incorrect outputs.

Write the row number to identify each incorrect output.

Row .....

Row .....

Row .....

Row .....

[4]

5 - (0984/12_Summer_2021_Q1)

A denary value can be converted into hexadecimal and binary.

(a) Complete the table to show the hexadecimal and 8-bit binary values of the given denary values.

Denary	Hexadecimal	8-bit binary
49		
123		
200		

[6]

Working space

.....

.....

.....

.....

.....

(b) Give **two** benefits, to users, of converting binary values to hexadecimal.

Benefit 1 .....

.....

Benefit 2 .....

.....

[2]

(c) Hexadecimal is used to represent Hypertext Markup Language (HTML) colour codes in computer science.

Identify **three** other ways that hexadecimal is used in computer science.

1 .....

2 .....

3 .....

[3]

6 - (0984/12_Winter_2021_Q1)

(a) Denary is a number system that is used by programmers.

Tick (✓) **one** box to show whether denary is a base-2, base-10 or base-16 number system.

Tick (✓)	
☐	Base-2
☐	Base-10
☐	Base-16

[1]

(b) Hexadecimal values can be used to represent denary values.

Convert these **four** hexadecimal values into denary values.

05 .....

20 .....

1A .....

AB .....

[4]

Working space

.....

.....

.....

.....

.....

(c) Hexadecimal values can also be converted to binary values.

Tick (✓) **one** box to show the correct 8-bit binary value for each hexadecimal value.

(i) Hexadecimal value 25

Tick (✓)	
☐	00011001
☐	00100101
☐	10100001

[1]

(ii) Hexadecimal value 1B

Tick (✓)	
☐	00011011
☐	10110001
☐	00011010

[1]

(d) (i) Give **one** way that hexadecimal is used in website development.

..... [1]

(ii) Give **one** way that hexadecimal is used in low-level programming.

..... [1]

7 - (0984/11_Summer_2022_Q1)

Jack has an MP3 file stored on his computer.

(a) (i) Tick (✓) to show which type of data is stored in an MP3 file.

	Tick (✓)
Video	☐
Sound	☐
Image	☐

[1]

(ii) Tick (✓) to show whether the MP3 file is a lossy compressed file or a lossless compressed file or **not** a compressed file.

	Tick (✓)
Lossy compressed file	☐
Lossless compressed file	☐
Not a compressed file	☐

[1]

8 - (0984/11_Summer_2022_Q4)

All data needs to be converted to binary data so that it can be processed by a computer.

(a) Explain why a computer can only process binary data.

.....

.....

.....

..... [2]

(b) The denary values 64, 101 and 242 are converted to 8-bit binary values.

Give the 8-bit binary value for each denary value.

64 .....

101 .....

242 .....

[3]

Working space

.....

.....

.....

.....

.....

(c) The hexadecimal values 42 and CE are converted to binary.

Give the binary value for each hexadecimal value.

42 .....

CE .....

[4]

Working space

.....

.....

.....

.....

9 - (0984/11_Summer_2022_Q5)

An image is stored on a computer. The image is 16-bit colour and is 100 pixels high and 150 pixels wide.

Calculate the file size of the image in bytes. Show all your working.

.....

.....

.....

.....

.....

Answer ..... bytes

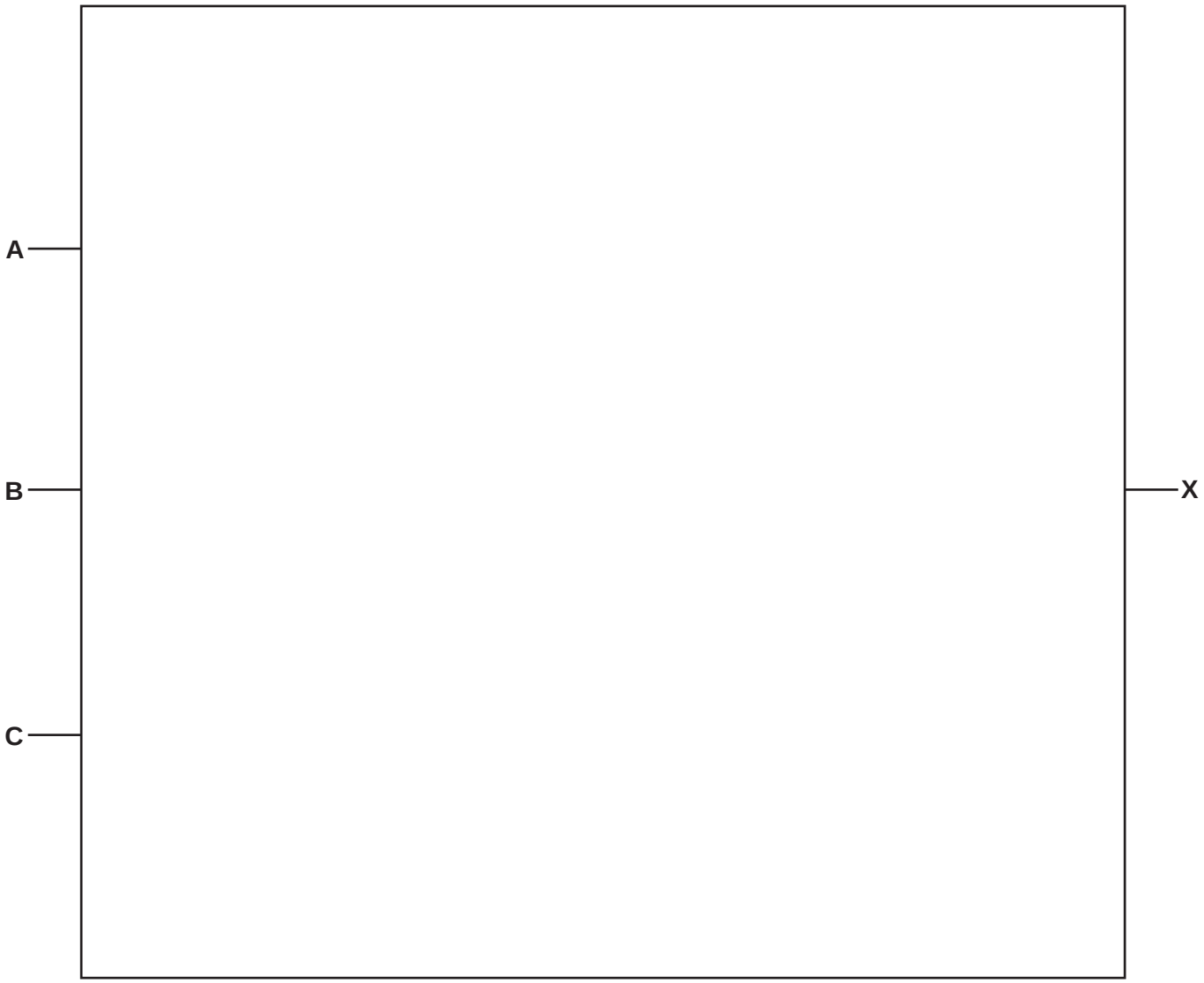
10 - (0984/11_Summer_2022_Q8)

Consider the following logic statement:

X = (((**A** AND NOT **B**) OR (NOT (**B** NOR **C**))) AND **C**)

(a) Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the logic statement. All logic gates must have a maximum of **two** inputs.



[6]

(b) Complete the truth table for the given logic statement.

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

1 - (0984/12_Summer_2020_Q7)

(a)(i)	– 12 (ignore leading zeros)	**1**
(a)(ii)	– 198 (ignore leading zeros)	**1**
(a)(iii)	– 1217	**1**
(b)	**One** mark per each correct hex value in correct order – 0E9	**3**

2 - (0984/12_Winter_2020_Q1)

(a)	Any **one** from: – Hypertext Mark-up Language – Web authoring language // **language** used to write/create websites/web pages	**1**
(b)(i)	– Presentation	**1**
(b)(ii)	**One** mark per each nibble: 43: 0 1 0 0 | 0 0 1 1 B7: 1 0 1 1 | 0 1 1 1 F0: 1 1 1 1 | 0 0 0 0	**6**
(c)(i)	– Input	**1**

(c)(ii)	**One** from: – Lossy (compression) Any **three** from: – A (compression) algorithm is used – Removes redundant/unnecessary data from the file – Removes sounds that cannot be heard by the human ear/background noise – Reduces sample rate – Reduces sample resolution – Data is **permanently** removed // original file cannot be re-instated – Perceptual music shaping is used NOTE: If lossless given, marks can be awarded for a correct description of lossless as follow through. Any **three** from (lossless): – A (compression) algorithm is used – Repeating patterns are identified – … are replaced with a value – … and indexed – No data is permanently removed // original file can be re-instated – Suitable example of a lossless algorithm	**4**
(c)(iii)	Any **two** from: – Quicker for her to upload – Quicker for users to download – Won't slow website down as much when loading – Takes up less **storage** space	**2**
(d)(i)	– Handshake (layer) – Record (layer)	**2**

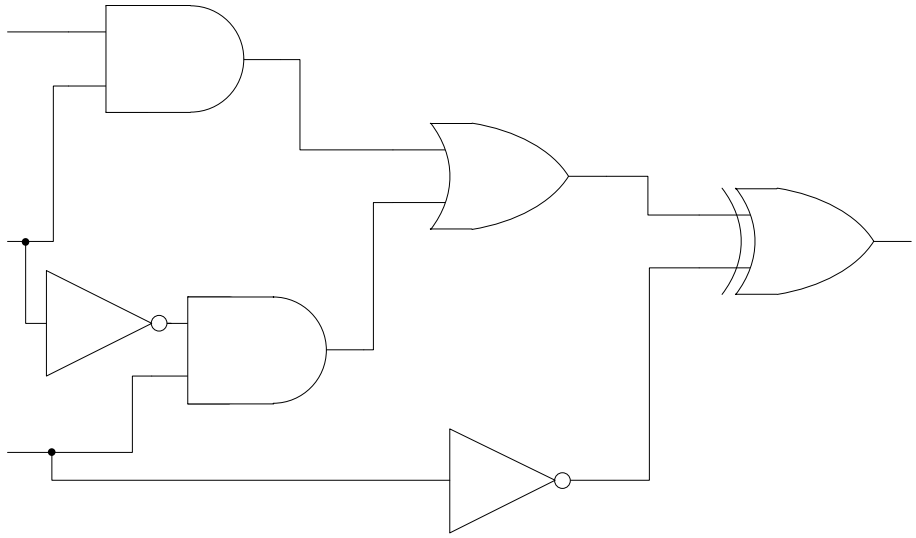
(d)(ii)	Any **six** from: – **Client/browser** requests secure **connection** to server – **Client/browser** requests the **server** to identify itself – **Server** provides a digital certificate – **Client/browser** validates the certificate – **Client/browser** send signal **back to server** (to begin transmission) – Session caching can be used – A session key is generated – Encryption method is agreed // data is encrypted	**6**
(e)(i)	Any **three** from: – Hacking – Denial of service (DoS) attack – Virus – Malware NOTE: Three different type of malware can be awarded	**3**
(e)(ii)	Any **four** from: – Acts as a firewall – Monitor/filters/examines incoming **and** outgoing traffic – Rules/criteria for traffic can be **set** // blacklist/whitelist **set** – Blocks any traffic that does not meet criteria … – … and can send a warning message **to the user** – Stop the website failing in a DoS attack // DoS attack hits the proxy server and not the webserver	**4**

3 - (0984/12_Winter_2020_Q2)

<table>
<tr><td>(a)</td><td>One mark for each correct row:

<table>
<tr><th>8-bit binary value</th><th>Even (✓)</th><th>Odd (✓)</th></tr>
<tr><td>11111111</td><td>✓</td><td></td></tr>
<tr><td>01100110</td><td>✓</td><td></td></tr>
<tr><td>01111011</td><td>✓</td><td></td></tr>
<tr><td>10000000</td><td></td><td>✓</td></tr>
</table>
</td><td>4</td></tr>
<tr><td>(b)</td><td>Any five from:
– A value is calculated from the data
– The value is calculated using an algorithm // by example
– The value is appended to the data to be transmitted
– Value is recalculated after transmission
– Values are compared
– If the values match the data is correct // if the values do not match the data is incorrect</td><td>5</td></tr>
</table>

4 - (0984/11_Summer_2021_Q6)

(a)	One mark per each correct logic gate, with correct input: 	**6**
6(b)	– Row 1 – Row 3 – Row 4 – Row 5	**4**

5 - (0984/12_Summer_2021_Q1)

(a)	One mark per each correct binary value. One mark per each correct hex value. **Denary** / **Hexadecimal** / **8-bit binary** 49 / 31 / 00110001 123 / 7B / 01111011 200 / C8 / 11001000	**6**
(b)	Any **two** from: – Easier/quicker to read/write/understand – Easier/quicker to identify errors/debug – Takes up less **screen/display** space – Less chance of making an error	**2**
(c)	Any **three** from: – MAC address – URL – Assembly language – Error codes // error messages – IP addresses – Locations in memory – Memory dumps	**3**

6 - (0984/12_Winter_2021_Q1)

(a)	– Base-10	**1**
(b)	– 5 – 32 – 26 – 171	**4**
(c)(i)	– 00100101	**1**
(c)(ii)	– 00011011	**1**
(d)(i)	Any **one** from: – To represent **HTML colour** codes – In error messages	**1**
(d)(ii)	Any **one** from: – Assembly code/language – Memory address locations – In error messages – Memory dump	**1**

7 - (0984/11_Summer_2022_Q1)

(a)(i)	• Sound	**1**
(a)(ii)	• Lossy compressed file	**1**

8 - (0984/11_Summer_2022_Q4)

(a)	• Computer consist of transistors / logic circuits/gates … • … that can only **store**/**process** data in **two states / high-low / on-off / 1 and 0**	**2**
(b)	• 01000000 • 01100101 • 11110010	**3**
(c)	• 0100 (1 mark) 0010 (1 mark) • 1100 (1 mark) 1110 (1 mark)	**4**

9 - (0984/11_Summer_2022_Q5)

	Two marks for two correct stages of working, **one** mark for correct final answer • 100 × 150 • 15 000 × 16 // 15 000 × 2 • 240 000 / 8 • 30 000 bytes	**3**

10 - (0984/11_Summer_2022_Q8)

(a)	**One** mark for each correct logic gate with correct input(s) 	**6**
(b)	**Four** marks for 8 correct outputs **Three** marks for 6/7 correct outputs **Two** marks for 4/5 correct outputs **One** mark for 2/3 correct outputs	**4**

A	B	C	Working space	X
0	0	0		**0**
0	0	1		**1**
0	1	0		**0**
0	1	1		**1**
1	0	0		**0**
1	0	1		**1**
1	1	0		**0**
1	1	1		**1**