2021-DSE
ICT
PAPER 2C

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2021

INFORMATION AND COMMUNICATION TECHNOLOGY
PAPER 2C
Multimedia Production and Web Site Development
Question-Answer Book

11:15 am – 12:45 pm (1 hour 30 minutes)
This paper must be answered in English

Please stick the barcode label here.

Candidate Number									

INSTRUCTIONS

(1) After the announcement of the start of the examination, you should first write your Candidate Number in the space provided on Page 1 and stick barcode labels in the spaces provided on Pages 1, 3, 5 and 7.

(2) Answer **THREE** out of four questions. Write your answers in the spaces provided in this Question-Answer book. Do not write in the margins. Answers written in the margins will not be marked.

(3) Supplementary answer sheets will be supplied on request. Write your candidate number, mark the question number box and stick a barcode label on each sheet, and fasten them with string **INSIDE** this book.

(4) No extra time will be given to candidates for sticking on the barcode labels or filling in the question number boxes after the 'Time is up' announcement.

* A 2 0 0 E 0 2 C *

Answer THREE questions only.

1. Mr Wong uses a web camera to record his lessons and posts the videos on the Internet for students to study.

(a) There are two options in the video recording settings, as shown below. Give **two** differences between the two options in terms of video quality.

Option	Resolution	Frames per second
A	720p	15 fps
B	4K	30 fps

(2 marks)

(b) Mr Wong records a 40-minute video. He wants to limit the file size of the video to not more than 500MB. Estimate the highest bit rate (in kbps) of the video that can be adopted. Show your calculation.

(2 marks)

(c) Even though Mr Wong hosts a web server at home, he decides to publish his videos on a video sharing platform.

(i) Give **two** reasons to support his decision.

(2 marks)

Answers written in the margins will not be marked.

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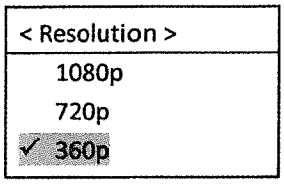
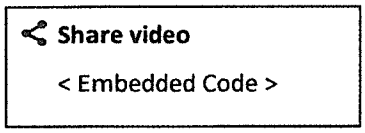
(ii) When a student plays the videos, the sharing platform automatically chooses the lowest resolution. Suggest **two** possible reasons for this.



(2 marks)

(iii) Mr Wong wants to share a video on his web page. He gets an embedded code from the sharing platform.



What kind of code does Mr Wong get? How can he share the video using this embedded code?

(2 marks)

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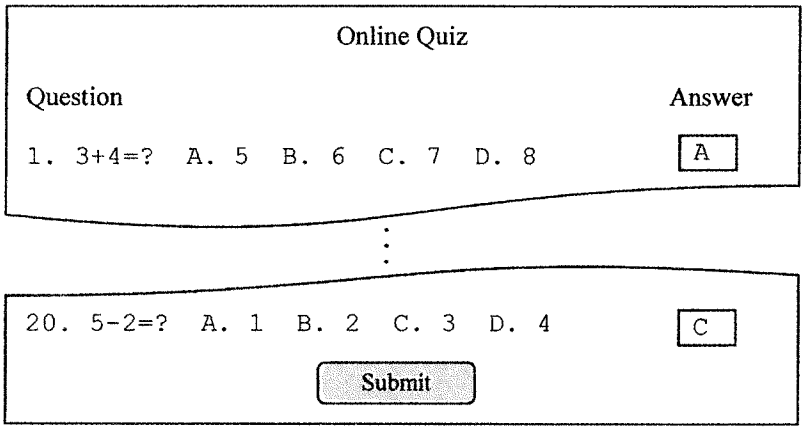
(d) Mr Wong develops an online quiz with multiple-choice questions, as shown below:



Describe a potential problem of the input design above. Suggest **two** different designs to address this problem.

(3 marks)

(e) Mr Wong decides to use CSS to build his web site. Give **two** reasons to support his decision.

(2 marks)

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2. Mary works in a kindergarten. She prepares some online learning materials for students.

(a) Mary decides to create a web site instead of a mobile application for students to access the learning materials.

(i) Suggest **two** reasons to support her decision.

(2 marks)

(ii) The web site should support different popular browsers. Give **two** technical aspects that Mary should consider when constructing web pages.

(2 marks)

(iii) Suggest and describe a client-side web design feature that can remind students to take a break after browsing the web site for an hour.

(2 marks)

Answers written in the margins will not be marked.

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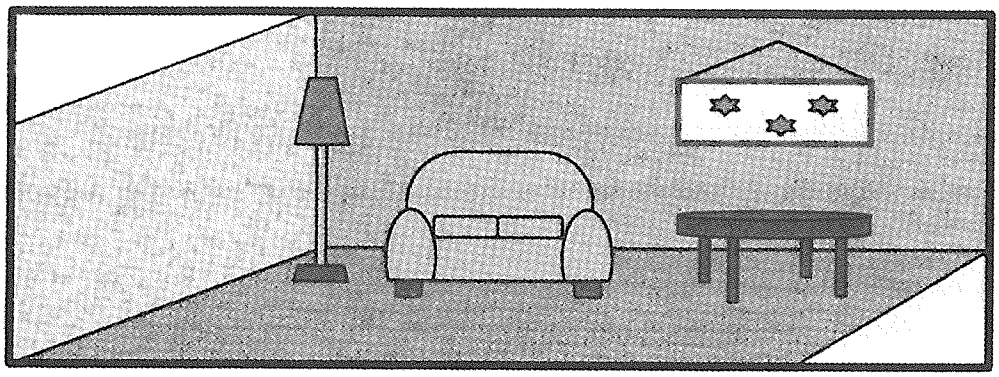
(b) Mary designs a web page including the following image with the resolution 7000 x 4000.



(i) Mary displays the image in 700 x 400 by changing the image attributes regarding the height and width in the HTML code. What will the change in the file size of the image be? Explain briefly.

(1 mark)

(ii) Other than the height and width, give an image attribute that can be changed in the HTML code.

(1 mark)

(iii) Suggest and describe an interactive web design in which Mary can use the image in the web page to teach the names of furniture (e.g. table and sofa).

(2 marks)

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Mary designs a spelling exercise on her web site:

Picture	Spelling	Result
	P h o n e	Correct
	S _ i s s e r	Incomplete
	H a a d	Incorrect
	P l _ _ e	Incomplete

(c) Give the advantage of using client-side scripts and server-side scripts respectively for generating the result for spelling.

Client-side scripts: _____

_____

Server-side scripts: _____

_____

(2 marks)

(d) Mary tries to register a domain name *hkhappysch.edu* but it has already been registered. Suggest another second-level domain name that includes *hkhappysch* .

_____

(1 mark)

(e) Mary wants to show the URL of a web page on a poster for parents to browse the web page but the URL is too long. Suggest **two** different ways for Mary to solve this problem.

_____

_____

_____

_____

(2 marks)

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3. Peter likes singing songs and playing music with an electric piano.

(a) Peter uses an electric piano to play and record some music in a file. He then plays the file back with the sound of violin.

(i) What is the file format? _____

(1 mark)

(ii) Other than file size, give an advantage of using the file format in (a)(i).

_____

_____

(1 mark)

(b) (i) Peter combines the audio channels of pianos and vocals to create an audio. Give **two** attributes of the audio that he can adjust when combining the audio channels.

_____

_____

(2 marks)

(ii) Peter considers audio file formats with lossy compression and lossless compression. Give the advantage of each compression.

Lossy compression: _____

_____

_____

Lossless compression: _____

_____

_____

(2 marks)

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(c) Peter records a song in two different MP3 files, P and Q:

Specification	P	Q
Sampling rate (kHz)	22.05	44.1
Sample size (bit)	16	8
Number of the channels	mono	stereo

(i) Assume that the duration of the song is 3 minutes and the compression ratio is 1:5. Estimate the file size (in KB) of P. Show your calculation.

(2 marks)

(ii) Finally Peter uses Q instead of P. Give **two** reasons to support his choice.

(2 marks)

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(d) Peter sets up a video broadcasting web site for visitors to view his live performance.

(i) The details of the video broadcasting are shown below:

The bit rate of the video broadcasting	8500 kbps
The network bandwidth for the streaming server	1 Gbps
The network bandwidth of a general visitor	300 Mbps

Each visitor should be able to view the performance smoothly. Suggest the maximum number of concurrent visitors allowed. Show your calculation.

(2 marks)

(ii) To edit recorded videos, Peter considers two different processes:

Process 1: Double the frame rate of the video without changing video data.
Process 2: Delete one frame for every two frames in the video.

Briefly describe possible changes of the duration and the file size of the video by each process.

Process 1:

Process 2:

(3 marks)

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4. Amy designs a toy store web site so that visitors can order toys online.

(a) (i) Amy considers using the following web design features, D1 to D5, to filter toys for children with different requirements:

D1: Checkbox	D2: Textbox	D3: Range sliders
☐ Item 1 ☑ Item 2 ⋮		10 — 25
D4: Radio buttons	**D5: Drop-down menu**	
○ Item 1 ◉ Item 2 ⋮	Option ▼ Item 1 Item 2 Item 3	

Choose a suitable web design feature for each input in the following table. Each feature (D1 to D5) can only be used **once**.

Input	Example of input data	Web design feature
Price	$101 – $200	
Suitable age	'4 or above'	
Multiple brand names of toys	'Wonder toy', 'Joyful kid'	
Gender	Male	
Keyword	bicycle	

(4 marks)

(ii) Amy thinks that it is not suitable to use textboxes for entering the delivery date and time. Draft a suitable design for Amy and describe it briefly.

(2 marks)

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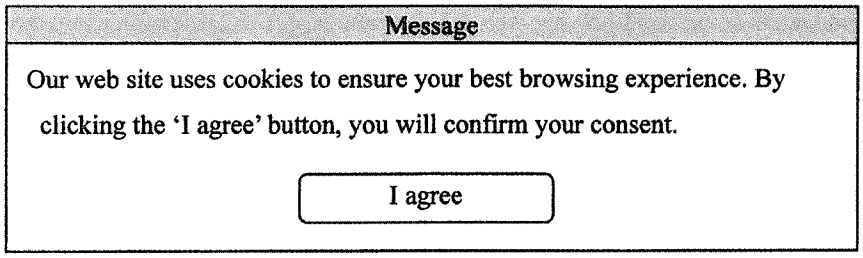
(iii) Amy creates the following window to deliver a message to first-time visitors.



Give two examples of the browsing experience that the above message refers to.

_____

_____

_____

_____

(2 marks)

(b) Amy plans to write an online number guessing game.

(i) `NUM` is an integer array. To generate a random answer, she writes a client-side script `MySwap(pos1, pos2)` to swap the values in `NUM[pos1]` and `NUM[pos2]`.

`temp` is a temporary variable. Complete the pseudocode for `MySwap` below.

```
MySwap(pos1, pos2)
    temp ← NUM[pos1]
    NUM[pos1] ← [          ]
    NUM[pos2] ← [          ]
```

(2 marks)

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(ii) In the game, players guess 4 numbers in the correct order to win. Amy uses the following variables to develop the game:

Variable	Description
ANSWER	An array to store the answer
GUESS	An array to store the numbers that a player guesses

Suppose that ANSWER and GUESS have already stored some values. Amy plans to write a client-side script CHECKANS to check if the player has guessed the answer correctly.

Example 1: CHECKANS returns TRUE for the following values.

i	1	2	3	4
ANSWER[i]	15	18	16	17

i	1	2	3	4
GUESS[i]	15	18	16	17

Example 2: CHECKANS returns FALSE for the following values.

i	1	2	3	4
ANSWER[i]	15	18	16	17

i	1	2	3	4
GUESS[i]	15	18	17	16

ALLCORRECT is a Boolean variable. Complete the pseudocode for CHECKANS below.

```
CHECKANS
    ALLCORRECT ← [          ]
    for i from 1 to [       ] do
        if GUESS[i] [   ] ANSWER[i] then
            [                                   ]
    return ALLCORRECT
```

(5 marks)

END OF PAPER

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