FUKIEN SECONDARY SCHOOL S4 First Term Uniform Test (2020-2021) Information and Communication Technology (1 hour)

Date: 21st October 2020 Time: 10:30 a.m. - 11:30 a.m.

INSTRUCTIONS

- 1. Write your name, class and class number on both the MC answer sheet and this Question-Answer Book.
- 2. Answer all questions. You are advised to use an HB pencil to mark all the MC answers on the MC answer sheet. Write your answers in the spaces provided in this Question-Answer Book.
- 3. Mark your MC answers on the MC answer sheet.
- 4. Hand in the MC answer sheet and this Question-Answer Book at the end of the test.
- 5. The total mark of this paper is 100.
- 6. Candidates are allowed to use a calculator which has been pad-printed with the 'H.K.E.A.A. APPROVED' or 'H.K.E.A. APPROVED' label.

Section A – Multiple Choice Questions (40 marks)

- 1. A bus company provides an online service for passengers to find bus routes. What information should passengers input?
 - (1) Starting point
 - (2) Destination
 - (3) Number of bus stops
 - (4) Bus fare
 - A. (1) and (2) only
 - B. (1) and (4) only
 - C. (2) and (3) only
 - D. (1), (3) and (4) only
- 2. 'In the 19th century, programming concepts were used in jacquard looms and self-playing pianos'. What does this statement imply?
 - A. There were computer chips inside the machines.
 - B. Algorithms were not applicable to the machines.
 - C. A high level programming language had been used.
 - D. The machines performed pre-defined actions repeatedly.

Name:	
Class:	No.:

3. Peter uses Table 1 to produce Table 2.

Travel agent	Phone number
Moon Tours	26663666
Monday Travel	51115111
Happy Tours	38884888

Travel agent	Phone number
Happy Tours	38884888
Monday Travel	51115111
Moon Tours	26663666

Table 1

Table 2

Which of the following ways of processing information is involved in the above action?

- A. Communication
- B. Reorganisation
- C. Validation
- D. Conversion
- 4. A remote-controlled toy car can be controlled using the following commands:

Direction	Speed Level (metre per minute)
Left	1, 2, 3, or 4
Right	1, 2, 3, 4, or 5
Forward	1, 2, 3, 4 or 5
Backward	1, 2 or 3

After completing the following four commands, the toy car goes back to its original position. What are the last command and its duration?

Command (direction and speed level)	Duration (minute)
Forward 1	10
Backward 1	3
Forward 5	1

	Command	Duration
А.	Backward 6	2
B.	Backward 5	2
C.	Backward 2	6
D.	Backward 1	8

- 5. Which of the following is not an existing application of the Hong Kong smart ID cards?
 - A. Transportation payment
 - B. Patient enrolment in the Electronic Patient Record Sharing Pilot Project
 - C. Library card
 - D. Automated passenger clearance at immigration
- 6. A device is sending 8-bit data in a network where the last bit is a parity bit. One of the following received data has an error. Which one is it?
 - A. 0010 0010
 - B. 1111 0000
 - C. 0011 0011
 - D. 1010 0111
- 7. Study the following online registration form:

Username:		
Password:		(minimum 8 characters)
Re-enter pas	sword:	

Which of the following is/are involved in the online registration?

- (1) Data verification
- (2) Data compression
- (3) Data validation
- A. (1) only
- B. (2) only
- C. (1) and (3) only
- D. (2) and (3) only
- 8. When changing the password of a school's Intranet account, which of the following is an example of data verification?
 - A. Input a new password twice.
 - B. Input a new password and a mobile phone number.
 - C. Input a new password that consists of at least one special character.
 - D. Input the old password and a new password.

- 9. During data input, which of the following can minimise input errors?
 - (1) Two's complement
 - (2) Double entry
 - (3) Type check
 - A. (1) only
 - B. (3) only
 - C. (1) and (2) only
 - D. (2) and (3) only

10. In which of the following hardware components can files be accessed in direct access mode?

- (1) Flash memory card
- (2) DVD-RW
- (3) Hard disk
- (4) Magnetic tape
- A. (1) and (3) only
- B. (2) and (4) only
- C. (3) and (4) only
- D. (1), (2) and (3) only
- 11. Which of the following statements about two's complement is/are correct?
 - (1) Overflow errors will not occur in arithmetic operations.
 - (2) The maximum value for an 8-bit number is 0111 1111.
 - (3) The minimum value for an 8-bit number is 1111 1111.
 - A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only
- 12. Radio frequency identification (RFID) readers are installed in the door of an office. Amy has an ID badge containing a RFID tag with a 2 KB storage capacity. Her personal information occupies 200 bytes. Every time she enters or leaves the office, a record of 40 bytes is created and stored on her badge. How many records can the badge store?
 - A. 44
 - B. 46
 - C. 48
 - D. 50

13. Mary uses a text editor to enter the following 5 traditional Chinese characters and saves them in a text file. The file size is 10 bytes.

世上無難事

Which of the following statements about the text file is/are correct?

- (1) Each Chinese character occupies 2 bytes.
- (2) ASCII code is used to represent the characters.
- (3) The text file does not support Big-5 code.
- A. (1) only
- B. (2) only
- C. (1) and (3) only
- D. (2) and (3) only
- 14. Below is an example of Korean text:

안녕하새요

Which of the following character encoding methods can be used to represent Korean text?

- (1) ASCII
- (2) Unicode
- (3) Big-5 code
- A. (1) only
- B. (2) only
- C. (1) and (3) only
- D. (2) and (3) only
- 15. A text file contains a character string '*IT*'. Peter uses a program to view the ASCII codes of the character string in the hexadecimal number system, as shown below:



How many bits are required to store the character string?

- A. 8
- B. 16
- C. 32
- D. 64

16. The following calculations involve 8-bit numbers using two's complement representation. Which one will generate an overflow error?

A.	0001	0101	+	1000	1000
B.	0111	0011	+	1000	1000
C.	1100	0110	+	1000	1000
D.	1111	1100	+	1000	1000

- 17. In a device, 8 bits and 16 bits are used to store a character and an integer respectively. How many bytes are required to store the string 'HKDSE5'?
 - A. 6 bytes
 - B. 7 bytes
 - C. 48 bytes
 - D. 56 bytes
- 18. The file sizes of the following original files are all 1MB. Under normal circumstances, after compressing them, which compressed file has largest file size?

	Original files	Compressed files
A.	testA.html	testA.zip
B.	testB.doc	testB.zip
C.	testC.txt	testC.zip
D.	testD.jpg	testD.zip

- 19. Amy plans to upload her photos to cloud storage. What is the benefit of using JPG format instead of BMP format in this case?
 - A. It decreases the width and length of the photos.
 - B. It decreases the file size of the photos.
 - C. It increases the number of pixels in the photos.
 - D. It increases the number of colours in the photos.
- 20. Which of the following actions involve the conversion of analog to digital data?
 - (1) Using software to convert a spreadsheet file into a PDF file
 - (2) Using software to convert speech to text
 - (3) Using a digital camera to take photos
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

Section B – Structured Questions (60 marks)

- 1. Sean is a programmer at Digit Limited (DL). His supervisor, Suzanna, is the systems analyst. Sean sometimes needs to consult Andrew, a systems programmer, about his programming work.
 - (a) Describe one job duty of each of the following personnel.
 - (i) Programmer
 - (ii) Systems analyst

(4 marks)

(b) Sean claims that he is information literate as he is very familiar with office automation application such as word processor, spreadsheet etc. Also, he can gather information from different sources and prepare a presentation in a very short time. Do you agree with his claim? Explain your answer briefly.

(2 marks)

(c) Sean is now working on a point-of-sale (POS) system for the Hogwarts supermarket. Customers use octopus card as electronic money to purchase items in the shop. Each shop has terminals with barcode readers and printers. The following is the network diagram of the system.



(i) Which part of the POS system stores the essential information of the selling items?

- (ii) State two data which should be stored in this information system.
- (iii) Give **two** advantages for the shop to adopt electronic payment method instead of using cash.

Advantage 1:	 	 	
Advantage 2:			
e			

(9 marks)

2. (a) A check digit is used to detect error due to typing mistakes made by the users. The following algorithm is used to check the validity of an 8-digit sequence.

Step 1: Add up the first seven digits of the 8-digit sequence.Step 2: Divide the sum by 3 and get the remainder.Step 3: Check whether the remainder is the same as the check digit.

(i) Validate 1234567(1) using the above algorithm.

Step 1:		
Step 2:		
Step 3:		

(ii) Is 1234567(1) a valid identity card number? Explain your answer.

(iii) State the problem of dividing the sum by 3 in Step 2. How to modify this step to refine the validation algorithm?

(iv)Describe other **two** data validation measures to validate the identity card number.

(8 marks)

(b) The following shows a registration form of Google account.

First name	Last name
Username	@gmail.com
You can use letters, numbers &	§ periods
Password Use 8 or more characters with	Confirm 🗞
37110013	Next

- (i) How many fields of data will be stored in the database?
- (ii) Which kind of data verification measure has been taken to check whether the user has entered a correct password? Describe the measure briefly.

- (iii) Suggest a data validation measure to validate the user's email. Describe the measure briefly.
- (iv) Comment why it is **not** appropriate to collect the age of the user. Which data should be collected instead of age?

(7 marks)

- 3. Complete the following tables.
 - (a)

BINARY	HEXADECIMAL	DECIMAL
		10010
	10016	
1002		

(6 marks)

(b)

DENARY VALUE	8-BIT 2'S COMPLEMENT
- 10010	
10010	

(2 marks)

(c) How many different numbers can be represented by 8-bit 2's complement representation?

(2 marks)

(d) State **two** characters coding system which can show traditional Chinese.

(4 marks)

- (e) In a certain information system, a 12-bit pattern (e.g. 101101011101) is used as a code to represent a component in the system, where the rightmost bit is a parity bit.
 - (i) Describe how a parity check can be used for data validation.

(ii) How many components can be represented in the above system?

(6 marks)

4. Mr. Cheung's web page contains many images.

- (a) Some image files on Mr. Cheung's web page are in GIF format.
 - (i) How many different colours does GIF format support?
 - (ii) Describe two special features supported by GIF format but not JPEG format.

(5 marks)

- (b) A bitmap image has a dimension of 100 × 100 and only supports black and white colours.
 (i) Give the colour depth of the image.
 - (ii) How many pixels are contained in the image?

- (iii) Hence, calculate the file size of the image, regardless of the header of the file. Give your answer in bit.
- (iv) Represent the file size in byte.
- (v) Represent the file size in KB.

(5 marks)

END OF PAPER