FUKIEN SECONDARY SCHOOL S6 First Term Uniform Test (2020-2021) Information and Communication Technology (1 hour)

Date: 21st October 2020 Time: 10:15a.m. – 11:15a.m.

Name:_____ Class: _____ No.: _____

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. Hand in the MC answer sheet and this Question-Answer Book at the end of the test.
- 4. The total mark of this paper is 62.
- 5. 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 (20 marks)

- 1. A check digit, '1', is appended to the end of the binary number '10011010'. Which of the following types of check digit is used?
 - A. Even parity check
 - B. Odd parity check
 - C. Modulo-7
 - D. Modulo-11
- 2. Which of the following numbers is/are larger than 120_{10} ?
 - (1) 100000_2
 - (2) 11110002
 - (3) 80₁₆
 - A. (1) only
 - B. (3) only
 - C. (1) and (3) only
 - D. (1), (2) and (3)
- 3. Which of the following formulae will give a result of 'Hell'?
 - (1) =LEFT("HelloWorld", 4)
 - (2) =MID("HelloWorld", 4, 1)
 - (3) = "He" + "ll"
 - A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (1), (2) and (3)
- 4. Which of the following statements about the primary key of a database table is/are correct?
 - (1) The data in the primary key field(s) must be unique among all the records in the table.
 - (2) The data in the primary key field(s) must not be blank.
 - (3) The data type of the primary key field(s) must be number.
 - A. (1) only
 - B. (3) only
 - C. (1) and (2) only
 - D. (1) and (3) only
- 5. A TV unit has the following three ports. High Definition (HD) videos will be output to the TV unit. Which of the following ports should be used?

(1) HDMI	(2) DVI	(3) VGA

- A. (1) only
- B. (2) only
- C. (1) and (3) only
- D. (2) and (3) only

- 6. When buying a wireless broadband router for a network at home, which of the following considerations is not necessary?
 - A. The data transfer rate of the broadband connection
 - B. Security protocols
 - C. The IP address of the router
 - D. Coverage of the router
- 7. Which of the following registers is used by the arithmetic and logic unit (ALU) of a CPU?
 - A. Program counter
 - B. Status register
 - C. Memory address register
 - D. Memory data register
- 8. Peter has entered a formula in cell B3 of a spreadsheet and then copied it to cells C3 and D3 as shown below.

	Α	В	С	D
1	2	2	4	8
2		6	6	4
3		-2	-1	2

The results in cells B3, C3 and D3 are -2, -1 and 2 respectively. Which of the following formulae is the possible formula in cell B3?

- A. =(\$B1-\$B2)/A1
- B. =(B\$1-B\$2)/A1
- C. =(B1-B2)/A\$1
- D. =(B1-B2)/(A1)
- 9. Which of the following can reduce the threats from using social networking web sites?
 - (1) Block or ignore people that you do not know or trust.
 - (2) Use default privacy settings to restrict access.
 - (3) Disclose the name and address in the account.
 - A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only
- 10. Sam has downloaded a piece of software, which can be installed free of charge, but only some functionalities can be used. The software is probably an example of
 - A. proprietary software
 - B. freeware
 - C. shareware
 - D. open source software

Section B – Structured Questions (42 marks)

1. Ruby designs an algorithm represented by the following pseudocode.

Line	Statement
10	input x
20	y ← 0
30	while $x <> 0$ do
40	у ← у + х
50	x 🗲 x - 1
60	output y

- (a) Dry run the algorithm and write the output when each of the following data is inputted.
 (i) 0
 - (ii) 4

(2 marks)

(b) Write the purpose of the algorithm.

(2 marks)

(c) The algorithm is implemented in a computer in which all memory addresses and data are 8-bit. The statement 'y ← 0' is represented by the following assembly instruction:
 STORE 1000 0000, 0000 0000

where the content of y is stored in the memory address 1000 0000.

Suppose that the instruction is executed once. Write the value stored in **each** of the following locations.

- (i) Memory address 1000 0000
- (ii) Memory address register (MAR)
- (iii) Memory data register (MDR)

(3 marks)

(d) The statement 'while $x \ll 0$ do' is represented by the assembly instruction

JPN 1000 0001, 0000 1011

where the content of x is stored in the memory address 1000 0001, and JPN will jump and execute the command stored in memory address 0000 1011 if the content of x is not zero.

- (i) Which register will be examined before deciding whether to jump to the command stored in 0000 1011?
- (ii) In order to jump to the command stored in 0000 1011, which register should change its value?

(2 marks)

- (e) The algorithm above is not completely correct.
 - (i) Describe one situation when an error will occur.
 - (ii) Modify the algorithm to correct the error in part (e)(i).

Line	Correction

(3 marks)

- 2. Typing words using a keyboard may wrongly reverse two adjacent characters, for example, 'sequence' may be typed as 'sequecne'. Tony wants to develop a typing correction system (TCS) to correct this kind of typing error.
 - (a) CmpRStr is the core subprogram in TCS. Tony is going to develop CmpRStr using the Waterfall Model.
 - (i) Fill in the following stages in the Waterfall Model.
 - (1) Integration
 - (2) Design
 - (3) Requirements
 - (4) Implementation



- (ii) In which stage should the selection of algorithms be done?
- (iii) In which stage can CmpRStr be executed independently?
- (iv) Tony has considered using Rapid Application Development (RAD). Give one limitation of RAD.

(7 marks)

(b) After compiling CmpRStr, linkers and loaders will be involved. Describe the major functions of linkers and loaders.

Linkers:

Loaders:

```
(4 marks)
```

CmpRStr(S, T) is the core subprogram in TCS and its pseudocode is shown below. S and T are arrays that store two strings. Assume that the index of the first character in S and T are 0.

```
CmpRStr(S,T)
 len \leftarrow length of S
 count \leftarrow 0
 if len = length of T then
     j ← 0
     while j<len-1 do
          if S[j] \neq T[j] then
              if (S[j]=T[j+1]) and (S[j+1]=T[j]) then
                  count \leftarrow count+1
                  j ← j+1
              else
                  count \leftarrow -1
                  j ← len
          j ← j + 1
     if j=len-1 then
          if S[len-1] \neq T[len-1] then
              count \leftarrow -1
     return count
 else return -1
```

(c) Write down the return values of CmpRStr for the following values of S and T.

S	Т	Return value of CmpRStr
banana	banna	
banana	canana	
banana	abanan	
banana	banank	

3. Amy, Ben and Clara work on a project on upgrading a document management system (DMS) in an international company. They have some discussions during the system development.

Discussion 1

- Amy: Which kind of programming language should we use for this project?
- Ben: I suggest using a procedural language such as Pascal.
- Clara: I prefer using an object-oriented language such as Python.
- (a) (i) Briefly describe how object-oriented languages are different from procedural languages in terms of programming paradigms.

(2 marks)

(ii) Give three criteria Amy can use to select a programming language for the project, other than programming paradigms.

(3 marks)

Discussion 2

- Amy: What is the progress of your programming work?
- Ben: I have completed the security module of the DMS. I need to know whether it is compatible with the current system.
- Clara: I have completed a new user interface. I need to know whether it meets users' expectations.
- (b) What type of testing should Ben and Clara each carry out? What is the importance of each type of testing?

Ben:	
Clara:	

(4 marks)

<u>Discu</u>	ussion 3
Amy:	What do you think about the system conversion?
Ben:	We should schedule a day for implementing the upgraded DMS and removing the old system in all the offices in different countries.
Clara	: I disagree. I think we should first implement the upgraded DMS in the Hong Kong office. After that, we can do it for the other offices.
(c)	Which strategy of system conversion (pilot conversion, phased conversion, parallel conversion or direct cutover conversion) did Ben and Clara each suggest? Give one advantage of each suggestion.
	Ben:
	Clara
	(4 marks)
(d)	Give two reasons why regular updates of the DMS are necessary for the company.
	() marke)
	(2 marks)

END OF PAPER

Appendix

Database (SQL commands - based on SQL-92 Standard)

Constants	TRUE, FALSE
Operators	+, -, *, /, >, <, =, >=, <=, <>, %, _ , ' , AND, NOT, OR
SQL	ABSOLUTE (ABS), AVG, INT, MAX, MIN, SUM, COUNT, AT, CHAR_LENGTH (LEN), LOWER, TRIM, SPACE, SUBSTRING (SUBSTR/MID), UPPER, AS, BETWEEN, BY, ASC, DESC, DISTINCT, FROM, GROUP, HAVING, LIKE, NULL, ORDER, SELECT, WHERE

Electronic Spreadsheet

Constants	TRUE, FALSE
Operators	+, -, *, /, <, >, =, <>, <=, >=
Functions	ABS, INT, RAND, SQRT, ROUND, AND, NOT, OR, CHAR, CONCATENATE (&), ISBLANK, LEFT, LEN, LOWER, MID, PROPER, RIGHT, TEXT, TRIM, UPPER, VALUE, AVERAGE, COUNT, COUNTA, COUNTBLANK, COUNTIF, MAX, MIN, RANK, SUM, SUMIF, FIND, VLOOKUP, IF