HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2012

INFORMATION AND COMMUNICATION TECHNOLOGY
PAPER 1 (SECTION A)

8.30 am – 10.30 am

(2 hours for both Sections A and B)

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should first stick a barcode label and insert the information required in the spaces provided. No extra time will be given for sticking on the barcode label after the 'Time is up' announcement.

2. When told to open this book, you should check that all the questions are there. Look for the words **'END OF PAPER'** after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS.** You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

> Not to be taken away before the end of the examination session

There are 40 questions in this paper. Choose the most suitable answers.

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. What are the 8-bit one's complement and 8-bit two's complement of the binary number 10110_2 ?

	One's complement	Two's complement
A.	11101001	11101010
B.	01001111	01010000
C.	00001001	00001010
D.	11110110	11110111

3. Which of the following actions involve converting data between digital and analog forms?

   (1) Playing mp3 music
   (2) Recording videos using a webcam
   (3) Copying a text file

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

4. Peter configures the colour quality of a display unit. Which of the following pixels are involved?

   (1) Black
   (2) White
   (3) Green
   (4) Red
   (5) Blue

   A. (1) and (2) only
   B. (3), (4) and (5) only
   C. (1), (2), (3) and (4) only
   D. (2), (3), (4) and (5) only

5. Peter and Mary share a database file X and execute database queries, T1 and T2, respectively. Which of the following activities should the database management system **not** do?

    (1) When T1 is reading X, T2 is reading X.
    (2) When T1 is writing records in X, T2 is writing records in X.
    (3) When T1 is deleting records in X, T2 is reading X.

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

6. Which of the following statements about clicking a hyperlink in a presentation file is correct?

    A. The hyperlink needs to involve HTTP.
    B. A browser will not open when the hyperlink is 'http://hkeaa.edu.hk/abc.doc'.
    C. A PDF reader will usually open when the hyperlink links to a PDF file.
    D. The presentation file will close automatically when the hyperlink links to another presentation file.

7. What formatting feature is used in the spreadsheet below?

Before:

	A	B	C
1	I am a superman		
2			

After:

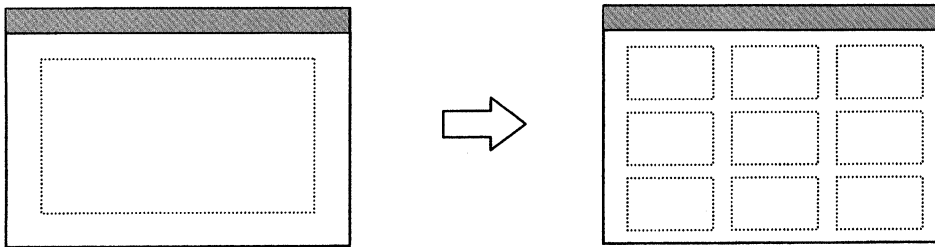|	A	B	C
1	I am a superman		
2			

    A. Merge cells
    B. Shrink text to fit
    C. Row height
    D. Wrap text

8. Mr Chan wants to produce a list of students who get 80 marks or above in a test, as shown in the spreadsheet below. Which functions should he use?

A	B
Name	Mark
May	68
Amy	44
Ada	60
Joe	92
Ben	95

⇨

A	B
Name	Mark
Ben	95
Joe	92
Zoe	86
⋮	⋮
Jan	80

A. Pivot table and sorting
B. Sorting and searching
C. Filtering and searching
D. Filtering and sorting

9. Assume that every household has a residential telephone number. In which of the following database applications could the residential telephone number be used as a key field?

A. Towngas accounts
B. Student personal profiles
C. Personal bank accounts
D. Library cards

10. Why should a software suite be used in an IT project?

(1) Data used in the project can be shared within the software suite effectively.
(2) Data files generated by the software suite are smaller.
(3) The project will be in a web-based format.

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

11. Which of the following statements about a check digit for a data item is correct?

A. The data item should not contain more than 8 characters.
B. The check digit cannot find all errors.
C. The check digit can correct errors.
D. The leading character of the data item should be a letter.

12. When editing a document, which of the following word processing features can enhance its readability?

(1) Tables
(2) Find and replace
(3) Footnotes

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

13. When using presentation software, the view mode is changed from single-slide to multiple-slide. What is/are the potential benefit(s) of this change?

(1) It is easier to insert an image.
(2) It is easier to re-arrange slides.
(3) It is easier to see an overview of the slides.

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

14. Which of the following is the main development trend for display units in desktop computers?

A. USB port
B. CPU computational power
C. User-friendly driver programs
D. Energy saving

15. Tom currently uses a software package on a desktop computer. He tries to install this software on his tablet computer but fails. Why?

(1) The tablet computer uses a different operating system.
(2) The tablet computer uses a virtual keyboard.
(3) The tablet computer uses a solid-state drive.

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

16. Why do many readers like using mobile devices to read books?

     (1) The ergonomic design of mobile devices helps relieve eye strain.
     (2) Mobile devices provide various functions which make reading convenient.
     (3) It is convenient for carrying a lot of books.

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

17. Carey wants to upgrade the DDR II 2G 667 MHz RAM of her computer to DDR III 2G 1333MHz RAM with a higher data transfer rate. Which of the following features should be considered?

    A. Motherboard design
    B. CPU computational power
    C. Power consumption
    D. ROM size

18. What is the main purpose of having a memory cache in a CPU?

    A. It increases the total memory storage capacity.
    B. It facilitates the CPU processing.
    C. It supports multi-core processors on the motherboard.
    D. It supports multi-tasking operating systems.

19. 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

Answer Questions 20 and 21 with reference to the following passage.

Carol uses a digital camera to take photos of her school hall. The photos will be uploaded and shown on the school's web pages.

20.   Which of the following image file types are suitable for her to use?

            (1) PNG
            (2) GIF
            (3) JPG
            (4) TIFF

        A.   (1) and (3) only
        B.   (1) and (4) only
        C.   (2) and (3) only
        D.   (2) and (4) only

21.   Before uploading a photo, what should Carol do?

        A.   If the file size of the photo is very large, she should divide it into small files for uploading.
        B.   She should reduce the photo size to fit the display.
        C.   She should adjust the resolution of the photo so that it is as high as possible.
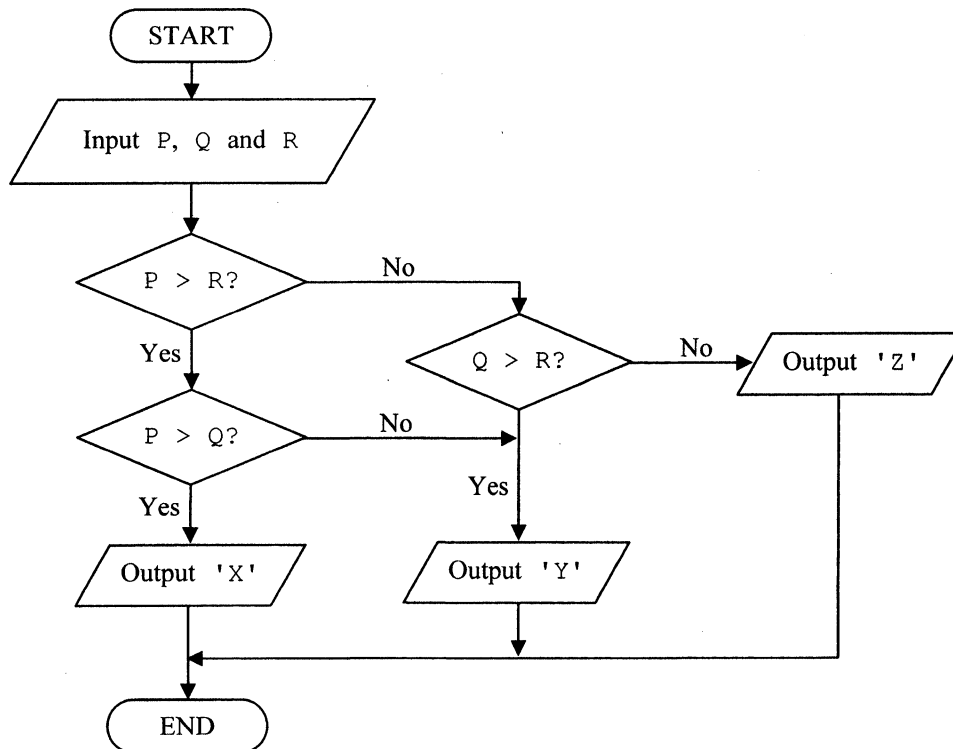   D.   She should adjust the number of colours shown in the photo to the highest number possible.

Answer Questions 22 and 23 with reference to the following passage.

Henry lives in Hong Kong. He likes bags made in Europe so he buys a bag through the online shopping web site of a shop in France.

22.   What are the possible reasons for Henry's choice to buy the bag online?

            (1) He can select and buy the bag during office hours in France.
            (2) There are many different kinds of bags for Henry to choose from.
            (3) The bag is not for sale in Hong Kong.
            (4) He has a credit card to pay for it.

        A.   (1) and (3) only
        B.   (1) and (4) only
        C.   (2) and (3) only
        D.   (2) and (4) only

23.   There are different kinds of online shopping web sites. What features do they usually have?

            (1) Electronic Fund Transfer
            (2) A peer-to-peer (p2p) network
            (3) Mainframe computers
            (4) A database management system (DBMS)

        A.   (1) and (3) only
        B.   (1) and (4) only
        C.   (2) and (3) only
        D.   (2) and (4) only

24. Which of the following can enhance the security of online banking?

    (1) Remote logon
    (2) Tokens
    (3) Peer-to-peer network

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

25. Why should network interface cards (NICs) be used in a computer network?

    (1) The network needs to support data transfer at 10GB per second.
    (2) NICs connect computers to the network.
    (3) NICs convert analog signals into digital signals and vice versa.

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

26. When using Internet search engines, it is better to include operators like '−' in search strings because

    A. the search time can be shorter.
    B. the search results include the titles of web pages only.
    C. the search results can be more relevant.
    D. the search results can include both local and foreign web sites.

27. At home, Mary cannot access the HKEAA's web site by entering http://www.hkeaa.edu.hk, but she can do it by entering http://210.0.205.228. Why?

    A. The DNS server is out of service.
    B. The web server is out of service.
    C. Her web browser needs an extra plug-in.
    D. The router used at home is out of order.

28. John can view an online video on the computer at home but not on the computer in his school. Why?

    A. The operating system does not support the video playback.
    B. The browser does not support the video playback.
    C. The video is not in HTML format.
    D. The maximum data transfer rate of the school network is low.

29. In an IT project, Tom has written the source code. He tests it with valid input data items. What should he do next?

    A. Check the modularity of the program design.
    B. Write the user manual.
    C. Draw the flowchart.
    D. Continue to test the program with invalid data items.

Answer Questions 30 and 31 with reference to the following flowchart.

30.   When P = Q and Q = R, what is the output?

A. X
B. Y
C. Z
D. A system error message

31.   If the three input values are different, which of the following statements is correct?

A. The output should always be 'Y'.
B. The output should always be 'Z'.
C. The output is 'X' if P is the largest value.
D. The output is 'X' if P is the smallest value.

32.   Dry run the following algorithm on the array AR.

```
cnt ← 1
ind ← 1
while cnt < 100
    cnt ← cnt + 2
    AR[ind] ← cnt
    ind ← ind + 1
```

What is the value of AR[5]?

A. 1
B. 7
C. 9
D. 11

33. Which of the following statements about open source software is correct?

   A. It is free of program bugs.
   B. It is cross-platform.
   C. It can be modified and distributed freely.
   D. It runs faster in a networked operating system.

34. Tom wants to store some weather information obtained from the Hong Kong Observatory. A sample of the weather information is shown below.

   Temperature: 25.8
   UV index: 4
   Air pollution: moderate

   Which of the following sets of data types is most appropriate?

	Temperature	UV index	Air pollution
A.	String	Character	String
B.	Integer	Character	Boolean
C.	Real	Integer	String
D.	Real	String	Boolean

35. Andrew creates the following group message through a social networking site.

   Dear best friends,

   The ABC shop has raised its prices and they are so high. I am so angry!

   Let's burn down the shop at midnight. Join us!

   Andrew

   Betty receives and forwards this message to invite her friends, but she does not join the event. Carol receives and reads this message from Betty. Carol does not take any action.
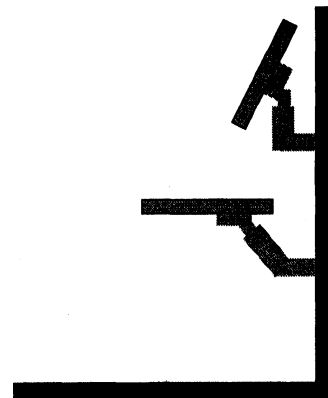
   Who has/have misused the social networking site and caused damage to the society?

   A. Andrew only
   B. Andrew and Betty only
   C. Andrew and Carol only
   D. Andrew, Betty and Carol

36. At home, John unintentionally detects his neighbour's WiFi network without any security measures. He can fully control the wireless router. What should he do?

   A. Ignore the network connection.
   B. Connect to the network for web browsing only.
   C. Connect to the network for transferring large files only.
   D. Configure the wireless router with an authentication key.

37. Some teenagers in Hong Kong are addicted to playing online games. Which of the following behaviours are common in this group of teenagers?

   (1) They prefer playing online games to joining face-to-face social activities.
   (2) They play online games as a way of escaping from daily life problems.
   (3) They feel irritable when being stopped from using computers.

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

38. When a virus is spread through a Bluetooth connection, which of the following applications installed on a notebook computer can prevent the infection?

   (1) Firewall
   (2) Email client program
   (3) Browser

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

39. The Hong Kong Government launched the Internet Support Learning Programme in 2011. The Programme helps needy students to acquire computer equipment and Internet access services. What issue is the Government addressing?

   A. e-learning
   B. Digital divide
   C. e-government
   D. Web 2.0

40. In a museum, visitors can stand in front of a kiosk with a monitor and a keyboard to access visitor information. Which of the following relate to ergonomic matters?

   (1) The viewing angle of the monitor is adjustable.
   (2) The height of the keyboard tray is adjustable.
   (3) Provide a mouse.

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

END OF PAPER

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2012

Please stick the barcode label here.

Candidate Number

INFORMATION AND COMMUNICATION TECHNOLOGY

PAPER 1 (SECTION B)

Question-Answer Book

8.30 am – 10.30 am
(2 hours for both Sections A and B)
This paper must be answered in English

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 and 5.

(2) **ANSWER ALL 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.

(5) The last page of this question-answer book contains a list of SQL commands and spreadsheet functions which you may find useful.

*A 2 0 0 E 0 1 B *

Answer all questions.

1. Peter buys two computers with the following specifications.

Type	Notebook Computer	Tablet Computer
CPU	2.80 GHz	1 GHz
Main memory	2 GB	512 MB
Storage device capacity	500 GB	64 GB
Display	13.3" LCD	9.7" LED
Input device	Keyboard	Virtual keyboard
WiFi	Yes	Yes
LAN port	Yes	No
USB port	Yes	Yes
Operating system	Linux (Fedora)	Android

(a) Name the storage devices commonly used in the two computers.

Notebook computer: _____

Tablet computer: _____

(2 marks)

(b) Use Part (a) and the specifications above to justify the following arguments.

(i) The tablet computer has longer battery operating time.

_____

_____

(ii) The tablet computer needs a shorter startup time.

_____

_____

(iii) The tablet computer is not suited to typing for a long period of time.

_____

_____

(3 marks)

(c) Peter wants to connect a printer to the tablet computer. Suggest **two** types of connectivity and describe the benefits of each.
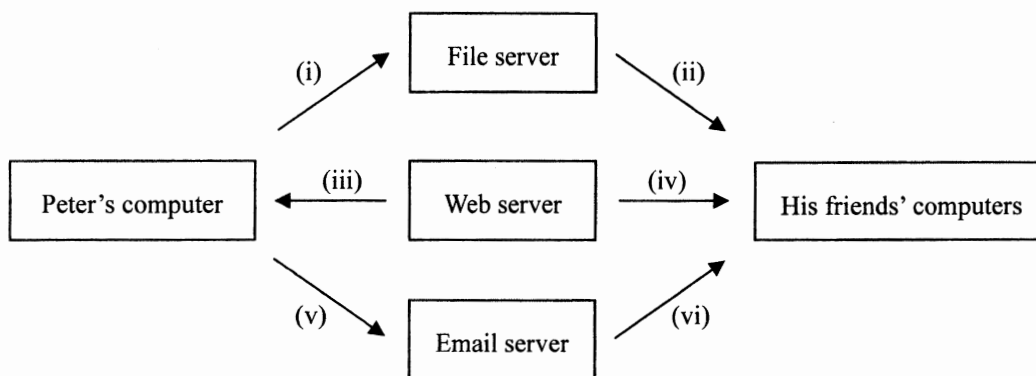
_____

_____

_____

(2 marks)

Provided by dse.life

(d) Peter takes some photos and shares them with his friends through the Internet. The protocols, HTTP, IMAP, FTP and SMTP, are used by the servers, as shown in the diagram below.

```
                              ┌─────────────┐
                    (i)    ↗  │ File server │  (ii)
                              └─────────────┘      ↘
┌──────────────────┐   (iii)  ┌─────────────┐ (iv)  ┌─────────────────────┐
│ Peter's computer │  ←────   │  Web server │ ────→ │ His friends' computers│
└──────────────────┘          └─────────────┘       └─────────────────────┘
                    (v)    ↘  ┌─────────────┐  (vi)  ↗
                              │ Email server│
                              └─────────────┘
```

Fill in the protocols used for the data transmission between the computers.

(i) _____   (ii)_____

(iii) _____   (iv)_____

(v) · _____   (vi)_____

(6 marks)

2. Janice opens an account on an online shopping web site and provides her personal email address and contact number. She purchases shoes through the web site. The web site uses a public and private key encryption system and owns a public key and a private key.

(a) Describe how the following help to keep Janice's account secure when she shops online.

(i) The login session is terminated automatically if the session is idle for five minutes.

_____

_____

(ii) The Secure Socket Layer (SSL) is used.

_____

_____

(2 marks)

(b) When the web site sends data with sensitive information to Janice, how will the public and private keys be used?

_____

_____

_____

(2 marks)

(c) Janice has forgotten the password of her account. The web site can send Janice an email with a link to activate her account and an SMS (Short Message Service) message containing a one-time password which is valid for only one login.

Give **two** advantages of this arrangement in terms of security.

_____

_____

_____

(2 marks)

(d) Janice understands that she should not use public computers to do the online transactions. Why not? Give **two** reasons.

_____

_____

_____

_____

(2 marks)

(e) Janice takes some photos and posts them on a social networking web site. The photos are openly accessed by Internet users. She feels shock when browsing the shopping web site because she can see some of her photos there.

(i) The shopping web site has posted her photos. Explain briefly why this is an unlawful action.

_____

_____

(ii) Janice's friends on the social networking web site post the photos to their non-commercial web sites. Is this appropriate? Explain briefly.

_____

_____

_____

(4 marks)

3. Consider the following algorithm.

```
A ← 1
B ← 1
While B < 20 do
        A ← A + B
        B ← A - B
        Output B
```

(a) Dry run the algorithm and write down the first three outputs.

_____

<div align="right">(2 marks)</div>

(b) (i) The algorithm is rewritten so that the number of outputs of B is stored in N. Complete the algorithm below.

```
A ← 1
B ← 1
N ← [            ]
While B < 20 do
    A ← A + B
    B ← A - B
    N ← [            ]
    Output B
Output N
```

(ii) Write down the final values of B and N.

B = _____   N = _____

<div align="right">(4 marks)</div>

(c) Suppose the initial values of A and B are changed. The values of A and B after 'Output B' is executed for the first time are 9 and 4 respectively. What are the initial values of A and B?

A = _____   B = _____

<div align="right">(2 marks)</div>

Provided by dse.life

(d) The algorithm is implemented in a computer in which all memory addresses and data are 8-bit. The statement A ← A + B is represented by the assembly instruction

ADD 1000 0000, 1000 0001

where the contents of A and B are stored in the memory addresses 1000 0000 and 1000 0001 respectively.

Suppose that the initial values in the memory addresses are:

Memory address	Value	Decimal Value
1000 0000	0000 1011	11
1000 0001	1000 0011	131

(i) Suppose that the instruction is executed once. Write down the value stored in the following:

  (1) Memory address 1000 0000 _____

  (2) Memory address register (MAR) _____

  (3) Memory data register (MDR) _____

(ii) How many different values can be represented by the memory addresses in the computer?

 _____

(4 marks)

Provided by dse.life

4. Sarah is a teaching assistant in a secondary school. She creates a table, STUD, to store the examination scores of all the students in a database.

STUD

Field name	Description
REGNO	Registration number
CLASS	Class
CNO	Class number
ENAME	English name
CNAME	Chinese name
CHI	Chinese language score
ENG	English language score
MATH	Mathematics score

(a) (i) Should Sarah use CNO as the key field of STUD? Explain briefly.

_____

(ii) Sarah decides to use Unicode for CNAME, instead of GB code or Big-5 code. Give a reason to support her decision.

_____

_____

(2 marks)

(b) Sarah executes a SQL command on STUD with four records, as shown below.

SELECT REGNO FROM STUD WHERE CLASS = '2A' and ENG > 50

REGNO	CLASS	CNO	ENAME	CNAME	CHI	ENG	MATH
20101001	1A	20	Wong Siu Man	王小文	80	90	100
20101002	1A	21	Chan Tai Man	陳大文	70	50	30
20114001	2A	18	Wong Chi Chun	黃子俊	40	50	30
20114002	2A	19	Li Lai Lai	李麗麗	70	80	90

What is the output?

(2 marks)

(c) Sarah imports the entire table into a spreadsheet for further processing. The table is shown below.

	A	B	C	D	E	F	G	H	I	J
1	REGNO	CLASS	CNO	ENAME	CNAME	CHI	ENG	MATH	Average	Grade
2	20101001	1A	20	Wong Siu Man	王小文	80	90	100		
3	20101002	1A	21	Chan Tai Man	陳大文	70	50	30		
4	20114001	2A	18	Wong Chi Chun	黃子俊	40	50	30		
5	20114002	2A	19	Li Lai Lai	李麗麗	70	80	90		

(i) Sarah wants to use column I to store the average scores of the three subjects. She enters a formula into I2 and then copies it into the other cells. Write the formula in I2.

_____

(ii) Sarah enters the following formula into J2 and then copies it into the other cells in column J.

```
=IF(I2<80, IF(I2<60, IF(I2<40, "D", "C"), "B"), "A")
```

What are the values in J2 and J3?

J2 = _____   J3 = _____

(3 marks)

(d) Sarah uses a word processor to type a report. Then she uses the spell checker to check the English words.

(i) Give examples to explain why the following mistakes can still occur.

(1) A word which has been wrongly typed is undetected.

_____

_____

(2) A correct word is indicated as a wrongly spelled word.

_____

_____

(ii) Other than spell checker, suggest another function of a word processor that is applicable to English words but not Chinese characters.

_____

(5 marks)

Provided by dse.life

5. A school wants to issue electronic newsletters to replace its paper-based school newsletters so that students can use their tablet computers to download and read them. The electronic newsletters will include multimedia information. Mr Li is responsible for the publication.

(a) What are the benefits to students of this digitisation? Give **two** examples.

_____

_____

_____

_____

(2 marks)

(b) Students can submit writing in electronic form and multimedia files for publication in the e-newsletter.

(i) Students use HTML format for submission. Give **two** reasons to support the use of this format.

_____

_____

_____

_____

(ii) Mr Li encourages students to submit audio files in wav format rather than other common formats. Why?

_____

_____

_____

(iii) Students submit video files in avi format, but Mr Li cannot play some of them on his computer. Why not?

_____

_____

(5 marks)

(c) Mr Li has completed a prototype of the e-newsletter and his colleague is going to present it to the Principal and school teachers. Mr Li can prepare either a presentation file or a video demonstration for his colleague to use for the presentation. Give **two** benefits of each mode.

Presentation file: _____

_____

_____

_____

_____

_____

Video demonstration: _____

_____

_____

_____

_____

(4 marks)

END OF PAPER

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

Constants	FALSE, TRUE
Operators	+, –, *, /, >, <, =, >=, <=, <>, %, _ , ' , AND, NOT, OR
SQL	ABSOLUTE (ABS), AVG, INT, MAX, MIN, SUM, COUNT ASC, AT, CHAR (CHR), CHAR_LENGTH (LEN), LOWER, TRIM, SPACE, SUBSTRING (SUBSTR/MID), UPPER, VALUE (VAL) DATE, DAY, MONTH, YEAR ADD, ALL, ALTER, ANY, AS, ASC, BETWEEN, BY, CREATE, DELETE, DESC, DISTINCT, DROP, EXISTS, FROM, GROUP, HAVING, IN, INDEX, INNER JOIN, INSERT, INTEGER, INTERSECT, INTO, LEFT [OUTER] JOIN, LIKE, MINUS, NULL, RIGHT [OUTER] JOIN, FULL [OUTER] JOIN, ON, ORDER, SELECT, SET, TABLE, TO, UNION, UNIQUE, UPDATE, VALUES, VIEW, WHERE

Electronic Spreadsheet

Constants	TRUE, FALSE
Operators	+, –, *, /, <, >, =, <>, <=, >=
Functions	ABS, INT, MOD, QUOTIENT, RAND, ROUND, ROUNDUP, ROUNDDOWN, SQRT, TRUNC, AND, NOT, OR CHAR, CODE, CONCATENATE, EXACT, ISBLANK, LEFT, LEN, LOWER, MID, PROPER, RIGHT, TEXT, TRIM, UPPER, VALUE AVERAGE, COUNT, COUNTA, COUNTBLANK, COUNTIF, LARGE, MAX, MIN, RANK, SMALL, SUM, SUMIF, SUMPRODUCT, SUMSQ, FREQUENCY DATE, NOW FIND, HLOOKUP, VLOOKUP, LOOKUP, SEARCH, CHOOSE IF