

ADVANCED LEVEL MOCK EXAMINATION 2010

COMPUTER APPLICATIONS AS-LEVEL
PAPER 1

Question-Answer Book

3 hours

This paper must be answered in English

MOCK PAPER

Instructions

1. This paper consists of Sections A and B. Section A carries 40 marks and Section B carries 60 marks.
2. Section A: Answer **all** questions. Write your answers in the spaces provided in this question-answer book.
3. Section B: Answer **all** questions in the separate answer sheets.

Name		
Candidate No.		

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Q.1		
Q.2		
Q.3		
Q.4		
Q.5		
Q.6		
Q.7		
Q.8		
Q.9		
Q.10		
Total		

Checker's Use Only	
Checker No.	
Total	⋮

Section A (40 marks)**Answer all questions in this section.**

1. Janet studies in ABC College. An e-mail account is provided to all students in the college. Students can either access their mail boxes via web mail or mail client software installed on workstations.

Janet gets the following information from the IT team in ABC College:

<i>SMTP Server Name: 61.204.2.1</i> <i>POP3 Server Name: 61.204.2.5</i> <i>DNS Server Name: 61.205.3.4</i> <i>DHCP Server Name: 61.205.3.2</i> <i>Default Gateway: 61.205.3.1</i>

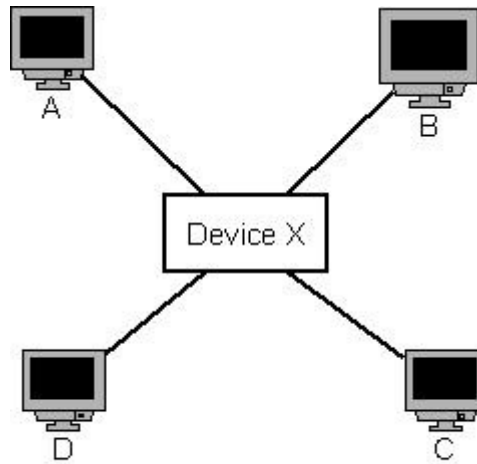
(a) If all machines above belong to the same subnet, what is the subnet mask they are using? (1 mark)

(b) Janet wants to configure the mail client software so as to read e-mails. Based on the provided information, fill in the following dialog boxes from the mail client software so that Janet can send and retrieve e-mails at home with the mail client software. (2 marks)

Server Information
Incoming mail server:
Outgoing mail server:

(c) Explain why the configurations in (b) are not necessary when web mail is used. (1 mark)

2. Device X is connected to four workstations as shown below. When a packet is sent from workstation A, Device X will forward the packet to all the connected workstations without inspecting the header of the packet.



(a)

- (i) Besides header, what are the two components of a packet?

- (ii) Suggest two pieces of information stored in the header of a packet.

- (iii) Suggest one advantage of using packets in data transmission.

(4 marks)

(b)

- (i) What is Device X?

- (ii) Besides forwarding packets, suggest another function of Device X.

(2 marks)

3. In a hospital, a doctor provides treatments to a patient. Each doctor is identified by a unique identifier called Dr_ID. Except the chief doctor in the hospital, each doctor is managed by a manager, who is also a doctor. Each doctor can provide treatments to any number of patients, while each patient can receive treatments by one or more doctors. Patients are identified by their HKID number. In each treatment, the treatment date and medication used will be recorded.

(a) Sketch an entity-relationship diagram to show the relationship between:

- Doctors and their managers, who are also doctors.
- Doctors and patients. (5 marks)



(b) Which level of data abstraction does the entity-relationship diagram belong to? (1 mark)

4. Linda is the secretary of a company. She is going to send an invitation letter to 30 persons, inviting them to join a function organized by the company. An extract of the letter is shown as follows:

1 Apr 2010
Dear XX YYY, I am writing to invite you....

After writing the letter, she finds that the letter is too long to be included on one page. She wants the whole letter to be displayed on one single page.

(a) Without amending the contents of the letter, suggest two methods to solve the problem. (1 mark)

(b) Linda is not very good at writing English letters. Suggest two features of a word processor which can improve the accuracy of the letter. (1 mark)

(c) After drafting the letter, Linda has to send the draft to her manager and colleagues for review. Suggest one feature of a word processor which allows Linda to know what amendments have been made by a particular person. (1 mark)

After reviewing the letter, Linda wants to perform a mail merge so that the second line of the letter will display things like “Dear Mr. Kwan” , “Dear Ms. Chan” etc.. She has prepared a spreadsheet for the mail merge. The format of the spreadsheet is as follows:

	A	B	C
1	Last name	First Name	Sex
2	Kwan	Leo	M
3	Chan	Betty	F
..

In the above spreadsheet, “M” and “F” in column C represent male and female respectively.

(d) Describe clearly the procedures Linda should do in order to perform the mail merge. (2 marks)

(e) Besides spreadsheet files, state two types of document which can be used as the data source of mail merge. (1 mark)

(f) Linda has inserted two pictures into the letter. After copying the letter from one machine to another, Linda finds that the pictures are missing in the letter. State two possible causes of the problem. (2 marks)

5. Below shows a database table called STUDENT, which stores the information about all students in Hong Kong.

STUDENT

Field Name	Description	Example
Student_ID	Identify the code of students. Unique for all students in Hong Kong.	H0978652
Name	Name of the student.	Chan Yee
School_Code	Identify the school. Unique for each school.	N168
School_Name	Name of the school.	ABC College
Class	The class where the student belongs to.	6B
Class_No	Class number of the student.	37
Age	Age of the student.	16

(a) Can Student_ID + Lastname+Firstname be the superkey of the table? Explain. (1 mark)

(b) Write down all candidate key(s) in the above table. (1 mark)

(c) Does the above table obey domain integrity? Justify your answer. (1 mark)

(d) Does the above table obey entity integrity? Justify your answer. (1 mark)

(e) Given that Student_ID is used as the primary key, is the above table in 2NF? Explain. (1 marks)

6. Ms Chan uses a computer in the public library to access online banking services. She accidentally executes an unknown program which may pose a threat to the security of the services.

(a) (i) What kind of program has she executed? (1 mark)

(ii) Suggest two ways for Ms Chan to reduce the threat to the security of the services. (1 mark)

(iii) The URL of the online bank starts with “https”. Explain what it means. (1 mark)

(b) Ms Chan wants to send a confidential e-mail to Mr. Wong. In the e-mail, she wants to prove that the e-mail is sent by her but not the others. She also wants to make sure that only Mr. Wong can read the e-mail. How can she achieve the above requirements using Public Key Infrastructure? (1 mark)

(c) Ms Chan uses an open source browser to browse the web. She finds a very interesting article in the web and so she copies the article onto her weblog. Does she violate the copyright law? Explain. (1 mark)

7. Clive installs a desktop computer, X, and a notebook computer, Y, forming a LAN connecting to the Internet through a 10M broadband connection in his room. The configurations of the computers are as follows:

	X	Y
CPU	Core 2 due 3GHz 2MB cache	P4 E4500 2.2GHz 1MB cache
RAM	2GB	1GB
Network	10/100 LAN Card	54M wireless LAN Card 10/100 LAN Card
Hard disk	320GB 7200rpm	120GB SSD

(a) As cache is “high-speed” memory, Clive wants to upgrade the processing speed of his machine by adding more cache memory. Comment on this action. (1 mark)

(b) In order to preserve the connectivity of X and Y in the LAN, should the same version of operating system be installed in both machines? Explain. (1 mark)

(c) When Clive uses Y for video editing, the following error message prompts out:

“The system is running out of memory.”

(i) Clive wants to solve the problem by adding a 4GB USB thumb drive to the system. Comment on this action. (1 mark)

(ii) Without installing the new hardware, suggest two ways to solve the “out of memory” problem. (2 marks)

(d) It is found that the word “rpm” does not appear in the hard disk configuration in Y. Explain. (1 mark)

Section B (60 marks)

8. In a common spreadsheet software package, SHEETA!A1:D5 refers to cells ranging from A1 to D5 on the worksheet named SHEETA.

Below is a spreadsheet called SheetA which stores the marks of computer quizzes for a group of S7 students studying CA in ABC College. These students are taught by two teachers, teacher I and teacher II. The marks of Quiz 1 to Quiz 4 are stored in column F to I respectively.

SheetA

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Class	No.	ID	Name	Teacher	Quiz 1	Quiz 2	Quiz 3	Quiz 4	Average	Total	Award	04 1B?	
2	4A	1	041101	Anna Au	II	53	77	85	81					
3	4A	21	041233	Celia Ma	II	44	45	46	77					
4	4A	36	031303	Jacky Lau	I	78	88	34	64					
5	4A	38	041425	Tom Ng	I	62	49	91	58					
6	4B	1	041318	Helen Au	I	81	39	65	79					
7	4B	8	041117	Karl Lam	II	54	87	43	26					
8	4B	10	041211	Cindy Lee	II	34	45	92	83					
9	4B	18	041213	Wing Wong	I	32	79	46	55					
10	4B	20	041426	Albert Wong	I	46	47	78	43					
11	4E	16	041210	May Ng	I	89	76	34	45					
12														
13														
14														
15														

(a) The student ID in column C is in the following format:

YYCCNN

Where

- YY represents the year the student entered ABC College.
- CC represents the class name of the student when he/she entered ABC College. Here, “11” represents class 1A, “12” represents 1B, “34” represents 3D.
- NN represents the class number of the student when he/she entered ABC College.

For example, a student with student ID “041325” means that when the student entered ABC College in 2004, he/she studied in class 1C with the class number 25.

(i) Someone suggests that instead of using the above convention, CC and NN should be replaced by the student’s current class name and current class number. State one advantage and one disadvantage of using this new convention.

- (ii) Teacher I suspects that the student IDs stored in column C contain duplicated entries. A formula is entered in C12 to justify his answer. If no duplicated entries are found, C12 will display “No” while “Yes” will be displayed otherwise. Write down the formula in C12.
-

- (iii) Teacher I wants to find out the number of students in the whole CA class who entered the school in 2004 and studied class 1B at the time the student enrolled. He then entered a formula into M2 and then copied into M3 to M11. Write down the formula in M2.
-

(6 marks)

- (b) Column J stores the average mark of the four quizzes. A formula is entered in J2 and then copied into J3 to J11. There are two ways to calculate the average mark:

Method One: $=\text{(F2+G2+H2+I2)}/4$

Method Two: $=\text{average(F2:I2)}$

Write down two disadvantages of Method One. (2 marks)

- (c) The total mark is obtained by taking the best three marks from Quiz 1 to Quiz 4. A formula is entered in K2 and then copied into K3 to K11. Write down the formula in K2. (2 marks)
-
-

An awarding scheme is launched for students with continuous improvements in quizzes. If a student gets two consecutive improvements in the four quizzes, he/she will be awarded. For example,

- Celia Ma will get an award because her mark in Quiz 4 is better than that in Quiz 3, while her mark in Quiz 3 is better than that in Quiz 2.
- Jacky Lau will NOT get an award. Although his mark in Quiz 2 is higher than that in Quiz 1, the mark in Quiz 3 is lower than that in Quiz 2. He failed to achieve two consecutive improvements.

(d) To determine whether a student can obtain an award, a formula is entered in L2 and then copied into L3 to L11. Write down the formula in L2. (2 marks)

(e) Teacher I wants to perform an analysis on the students he teaches, i.e. those who have entries “T” in column E. He has another sheet called SheetB which stores the information of students taught by him only. The sheet is shown as follows:

SHEETB

	A	B	C	D	E
1	Class	No.	Name	Total	
2	4A	36	Jacky Lau		
3	4A	38	Tom Ng		
4	4B	1	Helen Au		
5	4B	18	Wing Wong		
6	4B	20	Albert Wong		
7	4E	16	May Ng		
8					
9					
10			No. of students > Avg		
11					
12					

(i) Column D shows the total mark of students taught by Teacher I, which is obtained from Sheet A. A formula is entered in D2 and then copied into D3 to D7. Write down the formula in L2, given that cells A2 to C7 has been inputted manually by Teacher I a while ago. (2 marks)

(ii) Cell D10 stores the number of students with their marks higher than the average mark. Write down the formula in D10. (2 marks)

(iii) Describe, with steps, how Teacher I can view the marks of 4A and 4B students only. (2 marks)

(f) Spreadsheet is a powerful tool for “what-if analysis”.

(i) Suggest one kind of “what-if analysis” that can be done in SheetA. (1 mark)

(ii) State the feature(s) provided by spreadsheet making it a powerful tool for “what-if analysis”. (1 mark)

9. ABC College uses the following database files to store the information on students and the events joined by students on the Sports Day.

STUDENT

	Field Name	Type	Width	Description	Example of Data
1	SID	Character	5	Identity code of students	K1205
2	NAME	Character	20	Name of students	Chan Tai Man
3	DOB	Date	8	Date of birth	{ 1/5/1996 }
4	SEX	Character	1	Sex (M/F)	F
5	CLASS	Character	2	Class	2A
6	HOUSE	Character	1	House Code (Y,B,G,R)	R

STUDENT stores the information of students

PARTICIPATION

	Field Name	Type	Width	Description	Example of Data
1	SID	Character	5	Identity code of students	K1205
2	EVENT	Character	20	Name of the event participated by the student	Shot put

PARTICIPATION stores the information about students' participations on the Sports Day.

Write SQL statements to complete the tasks from (a) to (f).

(a) Add a new field called "CNUM" to the STUDENT table. CNUM represents the class number and should be one or two digits in length. (2 marks)

(b) List the number of male students taking part in each event. (3 marks)

(c) List the names of 3A students taking part in the Sports Day, and the corresponding events they joined. Arrange the result in ascending order of students' name. (3 marks)

(d) List the classes and names of Form 1 students who do not take part on the Sports Day. (3 marks)

(e) List the names of students taking part in two or more events. (3 marks)

(f) List the names and houses of students joining the Sports Day but not taking part in Shot put (Name of the event is called 'Shot put'). (3 marks)

(g) State one difference between DML and DDL. (1 mark)

(h) Besides DML and DDL, state two other functions provided by DBMS. (2 marks)

10. There are 5 floors in a school. The number of machines in each floor is as follows:

Floor	Workstations	Servers	Network devices
G/F	/	/	AP
1/F	20 Workstations	/	1 floor switch
2/F	20 Workstations (for multimedia center)	/	1 floor switch
3/F	5 Workstations	/	1 floor switch
4/F	9 Workstations + 3 Servers	1 file server, 1 domain controller, 1 DHCP server	1 floor switch, 1 core switch, 1 router, 1 firewall
5/F	10 Workstations	/	1 floor switch

The server room is located in 4/F where all the servers and switches on the 4/F are located in the server room. The network engineer is going to assign one floor switch for each floor, which connects to the core switch. Either 12-port or 24-port switch will be used.

(a) (i) Which floor switch (12 port or 24 port switch) should be used on the fourth floor? Explain.

(ii) Suggest one way to connect the AP on the ground floor to the network backbone.

(iii) State two protocols which can be used for a Wi-Fi user to connect to the AP in a secure manner.

(iv) It is found that 24-port switches are out of stock, and only 12-port switches are available. Draw a diagram showing how 12 port switch(es) can be used to connect the 20 machines on 1/F and the core switch on the 4/F.

(6 marks)

(b) The school is going to buy a media server for media streaming and broadcasting. Such a server will only be accessible by workstations in the multimedia center on the 2/F. To do so, a separate subnet will be created for workstations in the media center. The media server will either locate in the server room on the 4/F, or in the multimedia center on the 2/F.

(i) Suggest two advantages of locating the media server in the server room.

(ii) Suggest one advantage of locating the media server in the multimedia center.

(iii) State the advantage of using streaming for downloading the video.

(iv) Suggest one advantage of creating a separate subnet for workstations in the multimedia center on the 2/F.

(v) Without purchasing new network devices and without changing the current physical topology, suggest one way to create a separate subnet for workstations in the multimedia center on the 2/F.

(5 marks)

(c) The file server on the 4/F stores all the data files in the school. The backup policy of the file server is as follows:

- | |
|---|
| <ul style="list-style-type: none"> - <i>Performs full data backup every Saturday night.</i> - <i>Performs incremental backup every night, from Monday to Friday.</i> - <i>No backup is done on Sunday.</i> |
|---|

On one Thursday morning, the server is broken down and all the data are lost.

(i) Describe the procedures to recover the files.

(ii) Besides using backup, suggest another way to protect the data in the file server. (3 marks)

(d)

(i) The following information is given by the network administrator:

IP addresses of the router	160.24.3.2 and 172.19.2.15
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Below shows the configurations of a workstation on the third floor. Assume that 16 bit subnet mask is used, fill in the boxes below:

IP address	
Default gateway	

(ii) The above workstation uses DHCP to obtain server configurations. After obtaining an IP address from the DHCP server, the DHCP server is broken down. What will happen to the workstation?

e) The school is going to add a new FTP server onto the network. Describe three major software settings which network administrators should make on the server side to allow users to use FTP.

(6 marks)

END OF PAPER