Hong Kong Diploma of Secondary Education Examination (Practice Paper)

Information and Communication Technology Paper 1 (Section A)

Question No.	Key	Question No.	Key
1.	C	21.	D
2.	A	22.	B
3.	C	23.	B
4.	A	24.	C
5.	B	25.	B
6.	D	26.	A
7.	D	27.	C
8.	C	28.	A
9.	A	29.	C
10.	C	30.	D
11.	A	31.	D
12.	D	32.	A
13.	C	33.	D
14.	D	34.	A
15.	B	35.	A
16.	B	36.	C
17.	B	37.	A
18.	A	38.	B
19.	A	39.	B
20.	C	40.	C

香港考試及評核局
HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

香港中學文憑考試
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

練習卷
PRACTICE PAPER

資訊及通訊科技　　試卷一（乙部）
INFORMATION AND COMMUNICATION TECHNOLOGY　　PAPER 1 (SECTION B)

評卷參考
MARKING SCHEME

（2012 年 2 月 27 日修訂稿）
(updated as at 27 Feb 2012)

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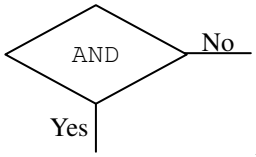
		Solution	Marks
1.	(a)	`CODE`	1
	(b)	Since the numbers of items in stock are whole numbers, there is no need to use real number data type to store them, which would require extra storage space. Calculation on the numbers of items in stock is likely to be necessary and string data type is not appropriate.	1 1
	(c)	Unicode should be used because the product names are in different languages.	1+1
	(d) (i)	N042 20.2 (① for incomplete answer or typo mistakes)	2
	(ii)	Use the filter function. Specify criteria “larger than 10” on `PRICE` and “less than 40” on `QTY`.	1 1
	(e)	Advantage: Speeds up the input process. Disadvantage: It is expensive to implement an RFID system.	1 1
2.	(a)	Light weight (0.5 kg) wireless Internet connection	1 1
	(b) (i)	Because of the absence of hard disk, it is lighter. / has lower power consumption.	1
	(ii)	No, it is because flash memory is non-volatile whereas SDRAM is volatile.	1+1
	(c)	BIOS / POST / Bootstrap program / Startup program	1
	(d) (i)	It is spread via e-mail (attachment). It is spread via web browsing.	1 1
	(ii)	A new computer virus is created and the technology used in the existing antivirus software cannot handle it. / The virus definition file is outdated.	1
	(e) (i)	Patrick should read the license agreement to find out what the rights/limitations of use of the software are.	1 1
	(ii)	She may be punished by fine / imprisonment.	1
	(f)	Advantage: Even though the computer is infected with a virus, it can be cleaned up after a restart. Disadvantage: All data/software updates / OS updates and new software installed may be removed after a restart.	1 1

Solution	Marks
3. (a) (i) `Attained`	1
`Distinction`	1
(ii) (1) -1 or 101	1
(2) pre-test / post-test	1
(b)  `AND` ① Yes+No ①	1, 1
(c) The algorithm indicated by Label X is more efficient because it executes a fewer number of comparisons in general.	1+1
(d) (i) Advantage: The design is compact. / fewer peripherals	1
Disadvantage: It is not a good ergonomic design. / The keyboard location is rigid. / It occupies the a portion of the screen.	1
(ii) Bluetooth	1
(iii) The driver is corrupted. / The driver has not been installed.	1
4. (a) (i) X: switch / hub	1
Y: router (firewall ×)	1
(ii) Optical fibre should be used because it supports a distance of 600 m.	1
(iii) The data transfer rate is low. Its performance is easily affected by the weather. The data transmission is exposed to the air and the security is vulnerable. (any two)	1×2
(b) Cable modems are used to modulate digital signals into radio-frequency signals carried by cable and demodulate the incoming radio-frequency signals into digital signals for computer processing. (① for presenting only a simple modulation concept)	2
(c) (i) POP	1
By default, email will be deleted from the email box once it has been downloaded to the client's machine so as to free up the storage space of the server for receiving more email. (automatic)	1
(ii) IMAP (webmail ×)	1
Any email the students read, move or delete will be updated across different computers. (Sychronisaton) /	1
Set all read and unread email to be stored in the server.	

Solution	Marks
5. (a) (i) It can minimise the input error.	1
(ii) Unavailable date (i.e. before 1-7-2008 or after 30-9-2010) Illogical date range (e.g. from 1-1-2010 to 1-1-2009) Invalid date (e.g. 30-2-2008) (any two)	1×2

(b) (i) `=AVERAGE(C3:F3)`
① ①
 	
`=SUM(C3:F3)/4`
 	
`=(C3+D3+E3+F3)/4`
	2

(ii) `=SUMIF(B3:B95,"P1",G3:G95) / 31` ①	2
(c) (i) Click the chart wizard button (activate the chart function) and select the chart type Select data in Sheet1!G97 (G97 in Sheet1) and Sheet2! G97 (G97 in Sheet2) (data selection) Enter the chart title / axis names / labels	1 1 1
(ii) Yes, the chart will change accordingly provided that there is a dynamic link (OLE) between the original one and the copy. / No, the dynamic link (OLE) between the original one and the copy is deactivated. (① for showing the simple concept of a dynamic link only)	2

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INFORMATION AND COMMUNICATION TECHNOLOGY　　PAPER 2A

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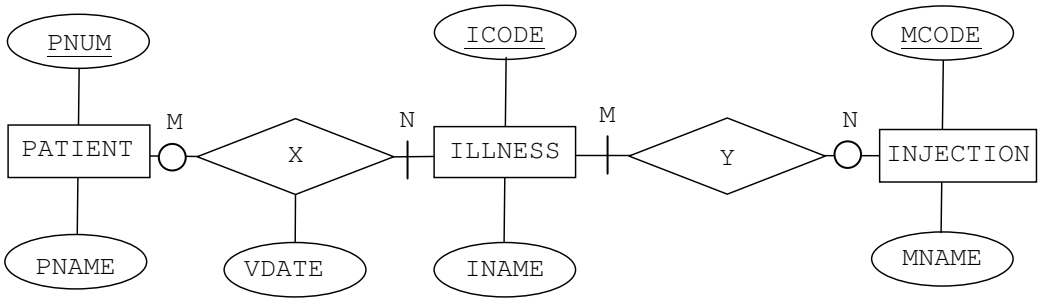
Solution	Marks

1. (a) (i) `CREATE TABLE CAND (`
`CNUM CHAR (8) UNIQUE,`
`CNAME CHAR (30),`
`DOB DATE)`
 	
`UNIQUE / PRIMARY KEY` ①
Other ①
	2

(ii) `CNUM` should be chosen as the candidate key because it is unique.	1 1
(iii) `CREATE INDEX CIND` `ON CAND(CNUM)` It improves the searching speed.	1 1 1
(b) Primary key: `CNUM+SCODE` Foreign key: `CNUM, SCODE`	1 1, 1
(c) (i) `ALTER TABLE CAND ALTER COLUMN` `CNUM CHAR(12) NOT NULL`	1 1
(ii) `SELECT CNAME, SUBSTR(CNUM, 1, 3)` `FROM CAND` `SUBSTR(CNUM,1,3)/SUBSTRING(CNUM,1,3)/MID(CNUM,1,3)/LEFT(CNUM,3)` ① Other ①	2
(iii) `INSERT INTO SUBJECT (SCODE, SNAME) VALUES` `('09', 'LAW')`	1 1

		Solution	Marks
2.	(a)	When more than one type of injection is prescribed for a patient, there is more than one record for that patient in `CLINIC`. `PNAME`, `VDATE`, `ICODE` and `INAME` are repeatedly stored. (① several injections for one illness) Condition (>1 injection, >1 illness, >1 visit) + relevant fields with data redundancy ①+① 'Partial dependency' + data redundancy (PNAME / INAME / MNAME) ①+①	1+1
	(b) (i)	X: Visits for / has Y: Prescribe	1 1
	(ii)	`M-N` ① `M-N` ① `0-1, 1-0` ①	3
			
	(c)	`X (PNUM, VDATE, ICODE)` `Y (ICODE, MCODE)`	2 2
	(d)	Yes, since the relationship between ILLNESS and INJECTION is M:N, the illness without injection can be stored in ILLNESS independently.	2
	(e) (i)	Deleting a record from `INJECTION` violates the referential integrity.	1
	(ii)	Add a Boolean field to indicate whether a medicine is prohibited or not. / Add a table to include the prohibited medicine. / Add a field to `INJECTION` to indicate the date of prohibition issued by the government.	1

3.	(a)	`SELECT RESNAME, RATING FROM RES`
		`WHERE RATING >= 3`
		`ORDER BY RATING DESC`
			1
			1
			1

	(b)	`SELECT AVG(SPENDING) FROM RES`
		`WHERE RESNAME LIKE '%Cafe%'`
		
		`AVG(SPENDING)` ① other ①
			2

	(c)	`SELECT RESNAME FROM RES, DIST`
		`WHERE RES.DISTRICT = DIST.DISTRICT`
		`AND DISTNAME = 'Mongkok'`
			1
			1

	Solution	Marks

(d)	`SELECT RES.DISTRICT, COUNT(*) FROM RES, CUI`
	`WHERE RES.CUISINE = CUI.CUISINE`
	`AND CUINAME = 'Thai'`
	`GROUP BY RES.DISTRICT`
	
	`COUNT(*)` ①
	Query with join condition ①
	`AND CUINAME = 'Thai'` ①
	`GROUP BY RES.DISTRICT` ①
		4

(e)	`CREATE VIEW DISTRICT_VIEW AS SELECT DISTRICT, COUNT(*)`
	`AS CNT FROM RES` ①
	`WHERE RATING > 3 GROUP BY DISTRICT` ①
	
	`SELECT DISTNAME FROM DISTRICT_VIEW, DIST` ①
	`WHERE CNT = (SELECT MAX(CNT) FROM DISTRICT_VIEW) AND DIST.DISTRICT =`
	`DISTRICT_VIEW.DISTRICT` ①
	
	`COUNT(*)` & `GROUP` ①
	Table (`RES`) & Condition (`RATING >3`) ①
	Subquery ①
	All correct ①
		4

4. (a) (i)	`TOTAL` can be calculated by the other fields.	1
(ii)	*x*: Integer *y*: Boolean	1 1
(iii)	Only one of the payment methods, C, P or Q, is allowed to be inserted into `PAYMETHOD`. / Only one of the choices, yes or no, is allowed to be inserted into `JUICE`. ① `PAYMETHOD / JUICE` ① concept of domain integrity	2
(b)	Ensure the database does not include too many unnecessary personal data. Ensure personal data is not leaked to unauthorised people.	1 1
(c) (i)	- no repeating elements (1NF) - no partial functional dependency (2NF) - no transitive functional dependency	1 1 1
(ii)	`MEALPLAN1` is better because one entry in `MEALPLAN1` can represent 31 entries in `MEALPLAN3`. It needs less storage space. / `MEALPLAN3` is better because it is more efficient at extracting information from the tables (SQL) when involving the computation of the data of meal types. (① state a reason without elaboration)	2
(d)	Fields for data mining: Class, Meal type, Juice Provide different selection of meals to different students	2

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1.	(a)		Network topology: Star network	1
			Advantage: It centralises the network management. / The entire network will not be affected even if a computer or a network cable is out of order.	1
			Disadvantage: When a network connecting device fails, all involved servers and workstations will be unable to connect to each other. / It needs more cables to construct and hence the cost is higher.	1
	(b)		Hubs will broadcast messages and spends more network bandwidth. Computers need to spend more resources to handle the broadcasting messages.	1×2
	(c)	(i)	CSMA/CD: Hub	1
			CSMA/CA: Access Point	1
		(ii)	Data collision occurs more frequently. ①	2
	(d)	(i)	Class C	1
		(ii)	Subnet mask : 255.255.255.0 / 255.255.255.128 / 255.255.255.192 / 255.255.255.224	1
			Default gateway : 192.0.1.3	1
		(iii)	DHCP: Advantage: The IP addresses can be assigned automatically. / It needs lesser manpower to configure the network addresses / Avoid assigning an IP address to two computers. Disadvantage: A DHCP server is needed (installation and configuration). / It increases the network traffic. Fixed IP: Advantage: As the IP address is changed, the connection with other computers will be more stable. Disadvantage: Every computer has to be configured. / The network connection may be affected because of human input error.	1×2
		(iv)	As 192.0.1.1 is a private IP address, it should be translated to a public IP address by NAT so it can be accessed via the Internet. ① concept of private/public IP addresses ① process of network address translation	2
	(e)	(i)	Install the printer in one of the workstations and make the printer sharable.	1
			Install the printer driver on the other workstations. / Mount the printer to the other workstations.	1
		(ii)	If the workstation that is physically connected to the printer is turned off, other workstations in the subnet will not be able to use the printer.	1
2.	(a)		P1: PC control software (block USB ports) P2: Backup software P3: Redundant Array of Independent Disks / RAID P4: Uninterruptible Power Supply / UPS	1×4
			Describe the functions of the corresponding hardware / software. ① × 4	1×4
	(b)	(i)	The web server of the school may be suspended / out of order.	1
		(ii)	The DNS server may be suspended / out of order.	1
		(iii)	The gateway/router may be suspended / out of order.	1

		Solution	Marks
2.	(c)	Use a command (e.g. `ipconfig`) to find out the IP configuration	1
		If there is a problem, correct the relevant network setting (e.g. IP address / subnet mask / gateway / DNS)	1
		Use a command (e.g. `ping`) to send signals to other computers and receive the acknowledge.	1
		It there is a problem, decide a solution based on the response status.	1
3.	(a) (i)	Proxy server: Store the content of the web sites and filters out indecent materials.	1
		Firewall: Examine the IP addresses of packages to check which to filter out.	1
	(ii)	Advantage: Web pages can be loaded faster as a proxy server can act as a cache.	1
		Disadvantage: Hackers' attacks cannot be detected and the network is more vulnerable.	1
	(b) (i)	Firewall: Block related ports or programs to stop the communication services such as port 80 (HTTP) and instant messaging applications. Proxy server: Redirect all web pages regarding social networking sites to something else.	2
	(ii)	Sets the firewall to block the FTP port. (① use of firewall)	2
	(iii)	Adjusts the user policy / access rights of the operating system. (① access right)	2
	(c) (i)	Virtual Private Network / VPN	1
	(ii)	The connection speed is slow.	1
		The system configuration is complicated.	1
4.	(a) (i)	Smartphone, tablet PC, PSP, etc.	1x2
	(ii)	Wireless network card	1
	(b) (i)	No, wireless networks can possess their own SSIDs without taking the others into account and these SSIDs are independent of each other.	1+1
	(ii)	Once wireless networks disclose their SSIDs, the wireless network card is capable of detecting them. / Those networks are within the region that the notebook computer can detect.	1
	(c) (i)		

	LIB-Y5a	LIB-Y5b
Figure 1	✓	✓
Figure 2	×	✓

			1 1
	(ii)	Figure 1: It authenticates users. Figure 2: It encrypts transmission data.	1 1
	(iii)	It requires an authentication service / server (RADIUS) to do so.	1
	(d)	The number of connections would exceed the limit of the APs. The network protocols are not compatible.	1 1

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1. (a) (i)	avi, flv, mov, mpg, rm, wmv (① 4 items)	2
(ii)	The web site becomes more user-friendly, as the users may not know the format of the files. There is no data loss due to file type conversion.	1 1
(b) (i)	It simplifies the design of the player. The file size is smaller, which helps the storage and transmission time.	1 1
(ii)	Resolution (frame size), bit rate, encoding scheme (any two)	1×2
(c) (i)	Method 1: The viewer can watch the video smoothly. The video can be editable. Method 2: The viewer can watch the video without waiting for a complete download. The viewer can view the up-to-date videos at the earliest time.	1 1 1 1
(ii)	It can prevent the viewer from copying the videos directly. Tailor-made functions (e.g. chapter) can be defined.	1 1
2. (a)	Design 1: Users cannot view many monuments at the same time. They need to scroll the web page frequently. The web page contains a brief description of the monuments. Users can acquire more information. Design 2: It is better for the users with poor eyesight as the images are larger. With a larger display layout, more information can be provided.	1x3
(b)	Table	1
(c) (i)	The text cannot be directly copied/searched. It takes a longer time to download.	1 1
(ii)	It can display font types that may not be available on other computers.	1
(d)	She can increase the compression ratio, reduce the colour depth and reduce the resolution.	1×3
(e)	It is faster to display the contour of the images. ①	2
(f)	It is impossible to take the photos exactly at the same height. (problem) It should allow some overlapping among adjacent pictures and hence 22 pictures are needed. (use of additional pictures)	1 1
(g)	Disable the right-click button of the mouse using JavaScript. Embed the pictures in a plug-in application.	1 1

Solution	Marks
3. (a) (i) It is because the browsers do not support such a graphics format.	1
(ii) It is a lossless image. (compression) / It supports transparency. / It supports animation.	1×2
(iii) Method (2) should be used. Otherwise, the enlarged bitmap graphics will become vague with saw-tooth edges.	1 1
(b) It supports users who use a poor connection to browse the web site. / It supports users who are visually impaired and browse the web site with a computer screen reader. / It supports users who use mobile devices with a small screen.	1×2
(c) (i) Step 1: Use an animation software package and import the logo. Step 2: Create a shape tween. / Set the first and the last scale pictures as the first and the last key frames. Step 3: Configure the software to automatically generate in-between pictures. OR Use the large image at the start position. Use the small image at the final position. Use some software function (e.g. tweening) to create the animation at the in-between positions.	1 1 1
(ii) 10 fps: The file size is smaller and hence it alleviates the network traffic. 30 fps: The display of the animation is smoother in motion.	1 1
(iii) It can minimise the problem due to the incompatibility of animation players. / It can allow users to browse the web site immediately. / Users who use a low bandwidth connection can choose to skip the animation so as to alleviate the demand of bandwidth. / Users who use a low performance computer can choose to skip the animation so as to alleviate the loading of the computer.	1×2
(iv) A button to repeat the animation / stop button / audio button (with appropriate description)	1

Solution	Marks
4. (a) Radio buttons	1
drop down list	1
(b) (i) (1) Method 2	1
(2) Method 1	1
(3) Method 2	1
(4) Method 2	1
(5) Method 3	1
(ii) Method 2	1
`window.open` / `alert` can be used to open the pop-up window during the validation process. (Justification)	1
OR	
Method 2 Method 1 cannot process pop-up windows. Only Method 2 and Method 3 do. Method 3 will increase the burden of the network and server. So Method 2 is more appropriate.	
(any appropriate explanation on client-side script functions)	
(c) (i) If the authentication process is done on the client side, all the usernames and passwords are needed to be saved on the client's computer. (understanding of the process on the client side)	1
This sensitive information has a higher chance of being exposed to people other than rightful users. (potential problem)	1
(ii) (1) Cookies	1
(2) It helps the network traffic, as there is no need to download the information from the server side every time (faster retrieval from the client side).	1
OR	
Maintain the status between the client and the server.	
OR	
Keep the user authentication information for the login next time.	
(3) Use `SUBMIT` action with `POST` method to transfer the authentication information.	2
① understanding of `SUBMIT` ① understanding of `POST`	
OR	
The hidden text is embedded in a form and is not displayed on the web page. During the transmission, data of the form with this hidden text will be sent to the server or relevant web pages for processing.	

香港考試及評核局
HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

香港中學文憑考試
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

練習卷
PRACTICE PAPER

資訊及通訊科技　　試卷二（D）
INFORMATION AND COMMUNICATION TECHNOLOGY　　PAPER 2D

評卷參考
MARKING SCHEME

（2012 年 2 月 27 日修訂稿）
(updated as at 27 Feb 2012)

本評卷參考乃香港考試及評核局專爲本科練習卷而編寫，供教師和學生參考之用。學生不應將評卷參考視爲標準答案，硬背死記，活剝生吞。這種學習態度，既無助學生改善學習，學懂應對及解難，亦有違考試着重理解能力與運用技巧之旨。

This marking scheme has been prepared by the Hong Kong Examinations and Assessment Authority for teachers' and students' reference. This marking scheme should NOT be regarded as a set of model answers. Our examinations emphasise the testing of understanding, the practical application of knowledge and the use of processing skills. Hence the use of model answers, or anything else which encourages rote memorisation, will not help students to improve their learning nor develop their abilities in addressing and solving problems.

Marking Scheme

General Notes for Teachers on Marking

1. This marking scheme has been updated, with revisions made after the scrutiny of actual samples of student performance in the practice papers. Teachers are strongly advised to conduct their own internal standardisation procedures before applying the marking schemes. After standardisation, teachers should adhere to the marking scheme to ensure a uniform standard of marking within the school.

2. The marking scheme may not exhaust all possible answers for each question. Teachers should exercise their professional discretion and judgment in accepting alternative answers that are not in the marking scheme but are correct and well reasoned.

3. The following symbols are used:

✗	This symbol indicates a wrong or unacceptable answer.
	Shaded words, figures or ideas are not essential for the candidate to be awarded the point.
/	A single slash indicates an acceptable alternative within an answer.
+	A plus sign indicates that there are two pieces of information and the second part will be awarded points only when the first part is correct.

4. In questions asking for a specified number of reasons or examples etc. and a student gives more than the required number, the extra answers should not be marked. For instance, in a question asking students to provide two examples, and if a student gives three answers, only the first two should be marked.

Solution	Marks

1. (a) (i)
```
For i from 1 to n do
    M[i] ← i
```
1
1

(ii) First pass

M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
1	2	3	0	5	0	7	0
M[9]	M[10]	M[11]	M[12]	M[13]	M[14]	M[15]	M[16]
9	0	11	0	13	0	15	0

1
1

Second pass

M[1]	M[2]	M[3]	M[4]	M[5]	M[6]	M[7]	M[8]
1	2	3	0	5	0	7	0
M[9]	M[10]	M[11]	M[12]	M[13]	M[14]	M[15]	M[16]
0	0	11	0	13	0	0	0

2

`M[9]` and `M[15]` are changed to 0. ①

(iii) 3 — 1

(iv) 8, 5, 4 — 2

(v) The algorithm is used to eliminate the composite numbers from 1 to n. (prime number) — 1

(b) The algorithm performs better because — 1
fewer unnecessary assignment statements are needed. — 1

(c) (i) Loader — 1

(ii) Dynamic linking — 1+1
When amending the subprograms in a dynamic linking library, the programs that are using them do not need to be re-compiled or re-linked.

2. (a) (i) (1)

	F[1]	F[2]	F[3]	F[4]	F[5]	F[6]
Flight number	**A1**	B2	Z6			

1

(2)

	F[1]	F[2]	F[3]	F[4]	F[5]	F[6]
Flight number	B2	Z6	S19	T20		

1

(ii) It is inefficient to shift items in an array one by one. — 1

Solution	Marks

(b) (i) `X` is used to indicate the position of the head of the queue. 1
`Y` is used to indicate the position of the tail of the queue. 1

(ii) (1)

	F[1]	F[2]	F[3]	F[4]	F[5]	F[6]
Flight number	**C3**	A1	B2	Z6		

X = 2 Y = 4 2

① all correct flight numbers
① correct values of `X` and `Y`

(2)

	F[1]	F[2]	F[3]	F[4]	F[5]	F[6]
Flight number	**C3**	A1	B2	Z6	S19	T20

X = 3 Y = 6 2

① all correct flight numbers
① correct values of `X` and `Y`

(iii) `X > Y` 1

(iv) Overflow error (out of bound error). 1

(c) (i)

Task \ No. of weeks	5	10	15	20	25	30	35	40	45	50
Task 0	■									
Task 1		X	X	X	X					
Task 2		X	X	X						
Task 3						X	X			

3

① each Task

(ii) He should use *Direct Cutover Conversion* as the cost is the lowest. 1
(Other systems conversion with justification)

	Solution	Marks

3. (a)

[Pascal version]

```
procedure LoadInit(var TrackNum : integer; var TrackTotal : integer);
begin
    TrackNum := 1;
    TrackTotal := 13;
end;
```

[C version]

```
void LoadInit(int *TrackNum, int *TrackTotal)
{
    *TrackNum = 1;
    *TrackTotal = 13;
}
```

[Visual Basic version]

```
Sub LoadInit(ByRef TrackNum As Integer, ByRef TrackTotal As Integer)
    TrackNum = 1
    TrackTotal = 13
End Sub
```

[Java version]

```
class LoadInit
{
    int TrackNum, TrackTotal;
    LoadInit (int x, int y)
    {
        TrackNum = x;
        TrackTotal = y;
    }

    void LoadInitFunc(LoadInit o)
    {
        o.TrackNum = 1;
        o.TrackTotal = 13;
    }
}
```

① parameter passed by reference
① initialise `TrackNum`
① initialise `TrackTotal`

3

(b)

[Pascal version]

```
function BackTrack(TrackNum : integer) : integer;
begin
    If TrackNum > 1 then
        BackTrack := TrackNum - 1
    else
        BackTrack := TrackNum;
end;
```

[C version]

```
int BackTrack(int TrackNum)
{
    if (TrackNum > 1)
        return(TrackNum - 1);
    else
        return(TrackNum);
}
```

3

	Solution	Marks

[Visual Basic version]

```
Function BackTrack(ByVal TrackNum As Integer) As Integer
    If TrackNum > 1 Then
        BackTrack = TrackNum - 1
    Else
        BackTrack = TrackNum
    End If
End Function
```

[Java version]

```
static int BackTrack(int TrackNum)
{
    if (TrackNum > 1)
        return TrackNum - 1;
    else
        return TrackNum;
}
```

① `if` statement
① return correct value
① all correct

(c) *[Pascal version]* — 2

```
function NextTrack(TrackNum : integer; TrackTotal : integer) :
integer;
begin
    TrackNum := TrackNum mod TrackTotal + 1;
    NextTrack := TrackNum;
end;
```

[C version]

```
int NextTrack(int TrackNum, int TrackTotal)
{
    TrackNum = TrackNum % TrackTotal + 1;
    return TrackNum;
}
```

[Visual Basic version]

```
Function NextTrack(ByVal TrackNum As Integer, ByVal TrackTotal As
Integer) As Integer
    TrackNum = TrackNum Mod TrackTotal + 1
    NextTrack = TrackNum;
End Function
```

[Java version]

```
static int NextTrack(int TrackNum, int TrackTotal)
{
    TrackNum = TrackNum % TrackTotal + 1;
    return TrackNum;
}
```

① parameter passed by value
① return correct `TrackNum`

Solution	Marks

(d) *[Pascal version]* — 2

```
function shuffle(TrackTotal : integer) : integer;
begin
    shuffle := trunc(myrand * TrackTotal) + 1;
end;
```

[C version]

```
int shuffle(int TrackTotal)
{
    return((int)(myrand() * TrackTotal) + 1);
}
```

[Visual Basic version]

```
Function shuffle(ByVal TrackTotal As Integer) As Integer
    shuffle = Int(myrand() * TrackTotal) + 1
End Function
```

[Java version]

```
static int shuffle(int TrackTotal)
{
    return (int) (myrand() * TrackTotal) + 1;
}
```

① correct use of `myrand`
① all correct

(e) (i) Test value: 1 — 1
Expected result: 1 (boundary case)

(ii) Test value: 13 — 1
Expected result: 12 (2 – 13; normal cases)

(f) (i) 2 — 1

(ii) `ButtonName` — 1

(iii) `Button` — 1

Solution	Marks

4. (a) (i) Check digit is used to validate an input number. 1

(ii) Local variables (accessible within the subprogram only) 1

(iii) It serves as a key for searching a record with the same account number in the file. 1

(iv) It serves as a flag to indicate whether a record in the file is matched. 1

(v) The string variable `accReading` should be converted and assigned to a variable of numeric data type. (type conversion) 1

(b) (i) `unitsConsumed` will eventually become a negative value (e.g. 0012 – 9998 = –9986). 1

(ii) ***[Pascal version]*** 2

```
if unitsConsumed < 0 then
     unitsConsumed := 10000 + unitsConsumed;
```

[C version]

```
if (unitsConsumed < 0)
     unitsConsumed += 10000;
```

[Visual Basic version]

```
If unitsConsumed < 0 Then
     unitsConsumed = 10000 + unitsConsumed
```

[Java version]

```
if (unitsConsumed < 0)
     unitsConsumed += 10000;
```

① Try to manipulate `unitsConsumed`

(c) ***[Pascal version]*** 1

```
close(infile);
```

[C version]

```
fclose(infile);
```

[Visual Basic version]

```
infile.Close()
```

[Java version]

```
infile.close();
```

(d) (i) `clientNum` is not matched with any `accNum` in the file. 1

(ii) ***[Pascal version]*** 2

```
while not clientFound and not eof(infile) do
```

[C version]

```
while (!clientFound && !feof(infile))
```

[Visual Basic version]

```
While Not ClientFound And Not (ClientST Is Nothing)
```

[Java version]

```
while (!clientFound && !infile.ready())
```

① 'AND' ① two conditions

(e) 1×3

Team member
PM
SA
PM
P