

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

## **MARK SCHEME for the October/November 2015 series**

### **9713 APPLIED INFORMATION AND COMMUNICATION TECHNOLOGY**

**9713/33**

Paper 3 (Written B), maximum raw mark 80

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Page 2	Mark Scheme	Syllabus	Paper
	Cambridge International AS/A Level – October/November 2015	9713	33

**1 Six** from e.g.:

data logging can be left unattended for periods of time  
 ...automatic logging of data  
 ...can be continuous or at intervals  
 ...can be set up to start sometime in future  
 ...to monitor e.g. temperature/relative humidity/solar radiation/soil moisture  
 (use of sensors to collect the data) about the conditions in air, soil, water  
 recording of amounts/quantity of e.g. oxygen, carbon dioxide, NO<sub>x</sub>, SO<sub>2</sub>  
 ADC may have to be used to convert data from analogue to digital format  
 software in data logging device acquires the data from the sensors  
 data logger stores data in digital format/suitable for import to spreadsheet/database  
 data logger stores data for a period of time  
 ...sends data in batch  
 ...sends data on request to a computer for processing  
 data logging software analyses data ready for presenting data in appropriate  
 format/tables/graphs/charts  
 data can be immediately sent from data logger and presented in real time on monitors/as  
 hardcopy/generate alert/alarm if readings outside set parameters

[6]

**2 Four** descriptions from e.g.:

MIN to indicate the minimum level of e.g. O<sub>2</sub> recorded  
 MAX to indicate the maximum level of e.g. O<sub>2</sub> recorded  
 AVERAGE of the collected values  
 Nested IF to find where e.g. high O<sub>2</sub> and low CO<sub>2</sub> occur  
 COUNTIF to count number of e.g. days when e.g. O<sub>2</sub> is below a safe level  
 COUNT the number of days that readings have been taken

[4]

**3 Eight** from e.g.:

*Benefits:*

data is continually monitored by computers  
 ...if event happens it is not missed  
 more accurate collection of data by sensors/computers  
 can monitor multiple sensors simultaneously  
 logged data is already in electronic form so no transcription errors/does not need to be entered  
 personnel are not needed to take the measurements so they can do other useful tasks  
 data can be displayed immediately/in real time  
 data can be analysed immediately/in real time

*Drawbacks:*

interruptions to power supply could cause collection of data to be missed/not happen  
 damage/failure of equipment could cause collection of data to be missed/not happen/be  
 inaccurate  
 maintenance of equipment can be expensive/time consuming/requires expertise/training

Max 6 for all benefits or all drawbacks

[8]

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge International AS/A Level – October/November 2015	9713	33

4 Six from:

use of FTP client on warehouse computers and FTP server at head office  
 ...uses FTP protocol  
 ...can be secured with use of SSL/TLS/SSH  
 FTP address of server is entered e.g. ftp.cie.org.uk  
 ...or use of IP address of server  
 user name and password required  
 ...anonymous connections (no user name and password required) may be allowed for downloads but not for uploads/private FTP servers  
 use of port 21 to send commands to server from client (communications port)  
 ...port is a 'logical connection point' for transferring data  
 use of a different port (the data port) for transfer of data  
 ...both communications port and data port must be open/connect for data to be transferred  
 active mode  
 ...client opens port and server connects to it  
 ...most servers use port 20 as data port  
 passive mode  
 ...server opens port and clients connects to it  
 firewalls must be set to allow FTP/ports that FTP uses [6]

5 (a) Proving who you are to the computer system [1]

(b) Two methods from e.g.:

**biometrics**

...valid example of use

**digital certificates**

...unique to user

**transaction authentication number**

...entered and verified against list issued and held by bank

...TAN only recognised/used once

**multi-factor authentication**

...two or more factors

...knowledge factor (something known only to user)

...possession factor (something only user has)

...inherence factor (something only user is) [4]

6 (a) Four from:

IP packets are interrogated/inspected by firewall

...source/destination address are checked

...data content checked for key words

...port checked to determine application that sent packet

...against a set of criteria/rules determined by user/system (network) administrator

firewall accepts/drops IP packets

...do not usually deny access to packets due to use of bandwidth to send it back

firewall alerts/reports to user

...about activity e.g. attempts to get access

...regular activity in/out network [4]

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge International AS/A Level – October/November 2015	9713	33

(b) (i) **Two** from e.g.:

guards cannot watch every aspect  
guards do not monitor areas continually  
guards can be forgetful  
guards can be dishonest

[2]

(ii) **Two** from:

requires more computer processing power to create file  
file creation can be slow  
if key is lost then data cannot be retrieved  
files are larger than unencrypted files  
criminals can use encryption to hide evidence  
hackers can encrypt files and demand money to unencrypt the file

[2]

## 7 Anti-virus software:

**Two** from:

install/run in background on computer  
regularly update  
scan all files regularly  
scan incoming files  
monitor ports on computer  
remove/quarantine viruses

### Anti-spyware software:

**Two** from:

install/run in background on computer  
regularly update  
scan computer regularly  
helps to prevent key-logging

### Anti-popup software:

**Two** from:

install/run in background on computer  
regularly update  
use to remove popup code

[6]

## 8 **Six** from:

use of radio waves  
use of random frequency switching  
...to increase security of data  
random number generators  
...choose random frequencies within band  
...transmission switches frequencies  
receiver and transmitter use same random numbers  
...to stay synchronised

[6]

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge International AS/A Level – October/November 2015	9713	33

9 **Two** reasons from e.g.:

must be in line of sight/unobstructed  
 ...so limited range  
 will not penetrate walls/obstacles  
 ...so devices have to be in same room  
 low frequency  
 ...cannot carry large amount of data

[4]

10 **Four** from:

same traffic key cannot be used twice  
 ...as limited number of keys  
 small amount of traffic can lead to key being recovered  
 ...so encryption can be broken  
 single shared key between a number of users  
 ...compromises security

[4]

11 **Eight** from e.g.:

*Benefits:*

data/files can be stored on central fileserver  
 can share files/data over a large area/between LANs  
 can share peripherals/storage between LANs  
 can send messages/email quickly between users on different LANs  
 allows employees to work from home on corporate WAN  
 central backups can be set up

*Drawbacks:*

can be expensive/complex to set up  
 can be expensive and complex to maintain requiring expertise/skilled technicians  
 larger networks are easier to compromise/security is of greater importance  
 use of peripherals e.g. printers can be slow due to queues of jobs  
 failure of servers can affect all users/workstations  
 malware can spread more easily between workstations

Max 6 for all benefits/drawbacks  
 One mark is available for a reasoned conclusion

[8]

12 (a) **Six** from:

computer-based system  
 using wide range of human knowledge  
 to help solve problems  
 uses knowledge base consists of a database of facts and the rules base  
 inference engine to find appropriate solutions  
 rules base consists of IF THEN statements  
 user interface to input questions/output possible solutions  
 knowledge base editor to edit rules and facts in in knowledge base

[6]

<b>Page 6</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS/A Level – October/November 2015</b>	<b>9713</b>	<b>33</b>

**(b) Two** from:

**medical diagnosis**

...to help doctors diagnosis patient illness

**identification systems**

...to help identify plants

...stone tools in archaeology

...structure of chemicals

**tax/financial planning/advice**

...calculating e.g. tax liabilities

**insurance planning**

...designing insurance packages for individuals/groups

...investment analysis

**mineral prospecting**

...probabilities of finding minerals/oil

**automatic pilots in aircraft**

...maintain flight/perform pre-set manoeuvres

...aid to human pilots

**[4]**

**13 (a) Four** from:

number of drop points

distance between each drop off point

location of drop off points

known road works/obstructions

type/speed of vehicle

time available

layout of map

**[4]**

**(b) One** from e.g.:

price of fuel

fuel consumption

number of hills on the route

known traffic black spots that might delay/slow journey times

**[1]**

**[Total: 80]**