

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2015 series

9713 APPLIED INFORMATION AND COMMUNICATION TECHNOLOGY

9713/31

Paper 3 (Written B), maximum raw mark 80

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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_x, SO₂
 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. O₂ recorded
 MAX to indicate the maximum level of e.g. O₂ recorded
 AVERAGE of the collected values
 Nested IF to find where e.g. high O₂ and low CO₂ occur
 COUNTIF to count number of e.g. days when e.g. O₂ 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]

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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]

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(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]

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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]

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(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]