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

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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International Examinations

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, NOx, SO_2
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_2 recorded
MAX to indicate the maximum level of e.g. O_2 recorded
AVERAGE of the collected values
Nested IF to find where e.g. high O_2 and low CO_2 occur
COUNTIF to count number of e.g. days when e.g. O_2 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]**

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]**

(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]**

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) **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]