



## General Certificate of Education

# Computing 5511/6511

### *CPT5 Advanced Systems Development*

# Mark Scheme

## *2006 examination - January series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

## Instructions to examiners

The following forms of notation should be used on candidates' scripts:

- **Ticks** - To indicate what is accepted as correct or creditworthy, placed in the body of the answer, and on diagrams;
- **Underscoring** – To identify errors/irrelevance in written answers;
- **Crosses** – to indicate a wrong answer;
- **Brief comments** – placed at suitable points in the body of the text to amplify the marking;
- **BOD** – means benefit of the doubt and is used where the candidate's answer has been given a mark on the balance of probabilities that the candidate's answer has met the requirements of the mark scheme even though it could be interpreted differently;
- **NE** – means not enough and is applied to an answer that falls short of what is required;
- **O/S** – means outside the mark scheme. The candidate's answer is creditworthy but the answer does not match any of the answers on the mark scheme for the particular question. Nevertheless a mark is awarded;
- **C/F** – means carried forward. This arises when a candidate offers an answer which is not creditworthy in one question but is creditworthy in a later question. The mark is carried forward to the question which is creditworthy;
- **C/B** – means carried back. This is similar to a carry forward but the mark is carried back to an earlier question.
- **T/O** – means talked out. The candidate's answer is contradictory.
- **^** - means missing term or symbol.
- **F/T** – means followed through. If a candidate made a mistake in the earlier part of an answer, mark the answer using the correct method on their answer from the earlier part.
- **≡** equivalent to an answer in the mark scheme

*The following notation is used in the mark scheme*

- **;** - means a single mark;
- **A** - means an acceptable creditworthy answer;
- **R** – means reject answer as not creditworthy.
- **I** – ignore
- **/** - means alternative word or sub-phrase
- **//** - means alternative answer.

### General Rules for Marking

Ignore Abbreviations

Ignore Brand Names

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**1**

Top down testing;

Bottom up testing;

Black-box testing;

White-box testing;

Dry-run / walk-through;

Unit/Module testing;

A Prototyping;

**R** Integration/Acceptance/Alpha/Beta/System/Performance/Compatibility testing

**R** anything clearly late in the development cycle

Mark first 3 responses only  
BUT  
beware of expansion on same line

max 3 **Total 3**

**2 a)**

A database is a pool/store/collection of data/records;

A database management system (is a program/software that) acts as an interface between user and database // DBMS controls the structure/access // DBMS is a layer of software between database and applications;

**A** manages access to data **R** manages data

2

b)

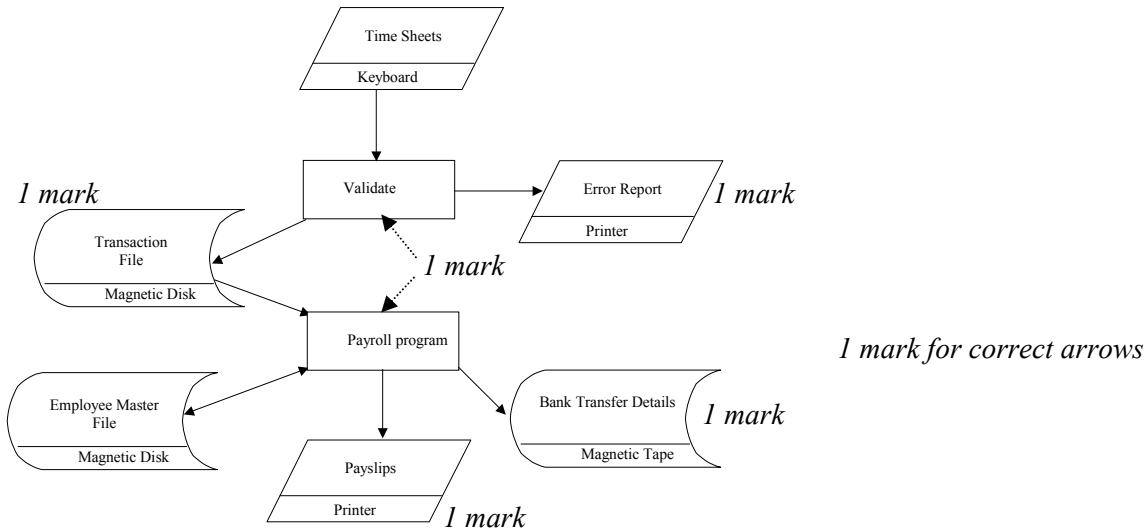
External / User / Local (Schema/View);

Conceptual / Logical (Schema); **A** The Schema;

Internal / Storage (Schema);

3 **Total 5**

3 a)



Allow two arrows between payroll program and Employee Master File to show both directions 6

b) system flow chart; **A** system flow diagram; 1

c) (i) 1 mark	(ii) 3 marks max
dot matrix printer / impact printer;	print head consists of a matrix of pins; pins impact on the paper; makes a dot on the paper from the carbon surface; pins in combination produce the required character; print head travels back and forth across the paper;
Character/daisywheel /golfball printer / impact printer;	Print head consists of preformed characters; Chosen character impacts on the paper; Makes shape of character on the paper from the carbon; Print head travels back and forth across the paper;
Line printer / impact printer;	Prints a complete line of characters at one time; The complete character set is provided in each printing position; Chosen characters impact on the paper; Make shapes of characters on the paper from the carbon;

4

**Total 11**

4 a) CandidateNumber; 1

b) table contains repeating groups; **R** repeated data/fields/attributes There is redundant data **T.O**  
 ModuleCode, ExamSession, ModuleMark, Level, TotalMark, Grade contain multiple values; *mention at least one attribute by name (forename/surname **T.O.**)* max 1

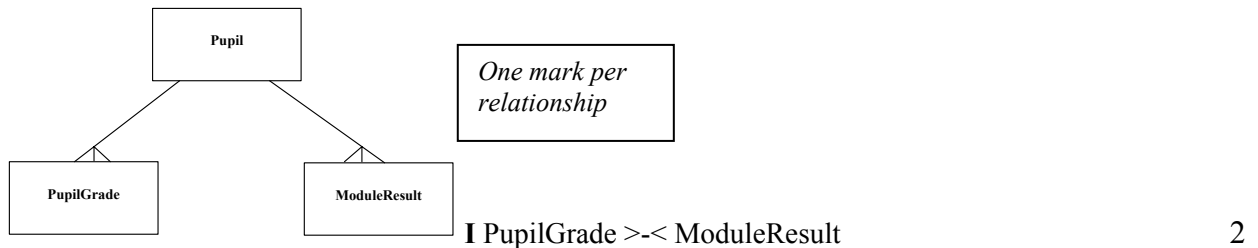
c) *1 mark for correct primary key, 1 mark for correct other attributes, 1 spaces/underscores in attribute names* *Extra attributes = T.O.*

i) Pupil (PupilForenames, PupilSurname, CandidateNumber);  
**A** (Forename,Surname,CandidateNo) 2

ii) ModuleResult (CandidateNumber, ModuleCode, ExamSession, ModuleMark) 2

iii) PupilGrade (CandidateNumber, Level, TotalMark, Grade) 2

d)



e) *Must use same attributes as in (c) above (mark as **F.T.**) I case*

SELECT PupilForenames,PupilSurname, Grade **I pupil. / pupilgrade.** 1 If pupilForename.pupil penalise once

FROM Pupil, PupilGrade 1

WHERE Pupil.CandidateNumber = PupilGrade.CandidateNumber 1

AND Level="A" *accept Level='A' or Level=A* 1

ORDER BY TotalMark DESC; **A** Descending 1

OR

SELECT PupilForenames,PupilSurname, Grade 1

FROM Pupil INNER JOIN PupilGrade ON Pupil.CandidateNumber = PupilGrade.CandidateNumber 2

WHERE Level="A" *accept Level='A' or Level=A* 1

ORDER BY TotalMark DESC; **R = Desc** 1 5 **Total 15**

5 a) *any two but mark is for description in context, not just naming the technique*

**interview** a manager of a cafeteria / the 'Healthy Eating' expert / cafeteria staff / users;

**interview** (a sample of) pupils; **A** interviewing existing users;

**observe** how cafeterias are being used / how food items can be labelled; **A** observe current system

**examine** documentation // research on the internet (of how a healthy diet is assessed);

**questionnaire/survey** of (a sample of) pupils/staff asking them about their views; 2

b) i) barcode scanner: swipe the labels of pre-packed foods;

ii) label printer: print labels for sandwiches/pre-packed food;

**A** print barcodes / price labels / food description

iii) smart card reader: store pupil's food choices onto pupil's smart card

*ignore answers to do with payment*

// store personal details/dietary requirements;

iv) touch sensitive screen: enter chosen food at checkout // easy to use POS; 4

c) Method <i>1 mark</i>	Justification <i>1 mark</i>
Parallel	To check against the pupil's food diary to ensure the data collected is correct; <b>A</b> if new system fails, they have the old one to fall back on;
Direct	It would take too long to check against pupils' food diaries // not a critical system // cheaper than parallel // cheaper than running two systems;
Pilot	The new system may not work very well and should be piloted in one school first (before being rolled out to all schools in the LEA);
Phased	Use the data collection module before the diet checking one, in case the system refuses to allow acceptable choices, causing chaos at the checkouts; <b>R</b> explanation of pilot

2

d)

data files will have to be entered into the system; **R** conversion/transfer of data

users / cafeteria staff / pupils will have to be trained; **R** printing labels

new hardware has to be installed/purchased; new software has to be installed; **I** licences

smart cards will have to be updated; pupils will have to be issued with smart cards;

define/create new operating procedures

**A** produce documentation/user guide/system guide

**max 3**

**Total 11**

**6 a)** in a peer-to-peer network there are no dedicated servers;

in a peer-to-peer network all computers are equal / have equal status;

each computer functions as both a client and a server;

user at each computer acts both as user and administrator;

user at each computer controls what is shared with other computers;

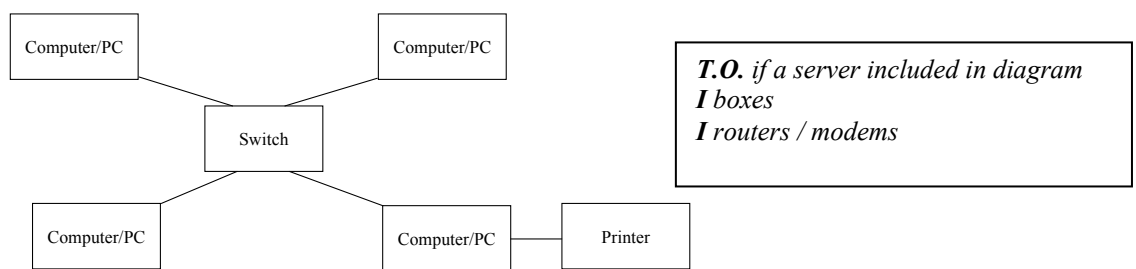
a user logged in at one peer computer is able to use resources on any other peer computer;

**R** each computer directly connected to each other, so can send to each other without a server

**R** all computers have same rights

max 1

b)



1 mark for switch with 4 computers/PCs connected; 1 mark for printer connected to computer; 2

c) i) Computer C is in a different subnet // network ID is different; **A** correct IP address 1

**A** there are two subnets

**R** not on the same LAN

ii) 192.168.5; **A** 192.168.5.0; 1

iii) 0-255; more correctly: 1-254; **or any in the range** 192.168.5.1 – 192.168.5.254

**R** a specific IP address

(since 0 means all addresses on subnet, and 255 is reserved as broadcast address) 1

d) i) a router is a device that receives datagrams/packets from one computer and uses the IP addresses that they contain to pass on these packets, correctly formatted, to another computer;

a router is a device that uses IP addresses to route packets/datagrams;

router keeps LAN traffic segregated from connection to ISP;

1

ii) IP address: 222.125.105.15

Reason: router needs to have a presence on Internet so that it can be reached from anywhere;

Public address must be unique over whole Internet // must be visible on Internet // provides

identity on Internet; **A** because 192.168.5.1 is a private/non-routable address; 2

iii) 192.168.5.1

**1 Total 10**

7 (a) converting/transforming from plain text into ciphertext/secret code;

A scrambled; A transposition / conversion / coding

the sender processes the message prior to transmission so that if it is accidentally or deliberately intercepted while it is being transferred it will be incomprehensible to the intercepting party;

Data coded so that unauthorised users can't read or access the data; max 1

(b) (i) B's public key; 1

(ii) B's private key; 1

(c) (i) a hashing function is applied to the text of the message;

the result/message digest is encrypted;

using B's private key;

A the data generated is added to the end of the message;

A message/date stamp is used to produce digital signature; max 3

(ii) A uses Certificate Authority's public key;

to verify B's public key;

digital signature is decrypted;

using B's public key;

the hashing function is applied to the text of the message;

the result of the hashing function is compared with the digital signature;

if they are the same the message is authentic; max 4 **Total 10**