CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series
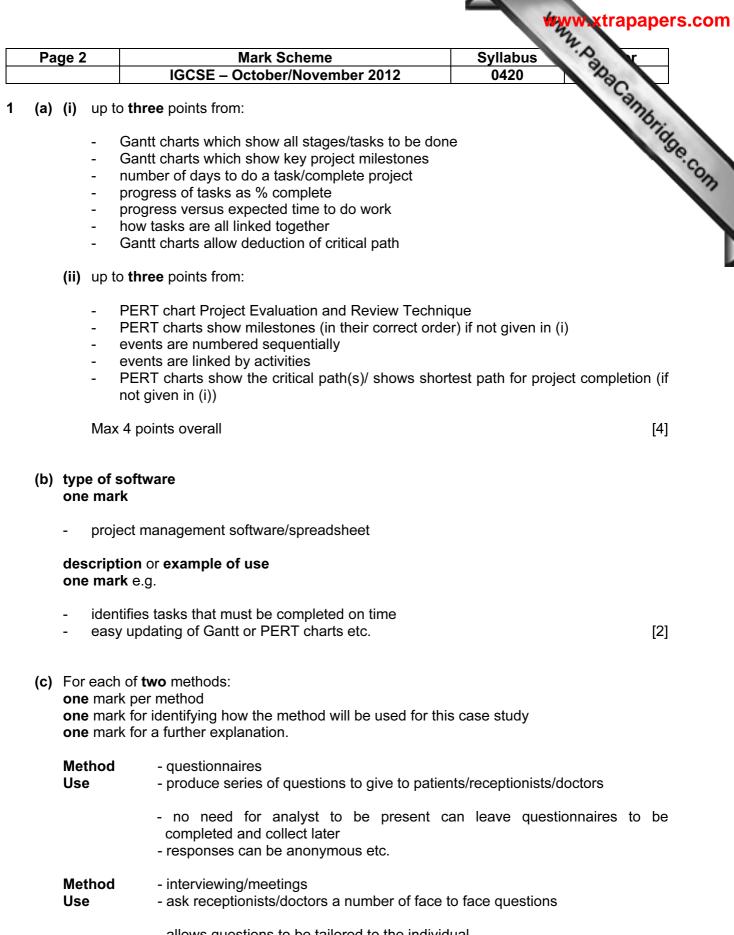
0420 COMPUTER STUDIES

0420/31 Paper 3, maximum raw mark 60

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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1 (a) (i) up to **three** points from:

- Gantt charts which show all stages/tasks to be done
- Gantt charts which show key project milestones
- number of days to do a task/complete project
- progress of tasks as % complete
- progress versus expected time to do work
- how tasks are all linked together
- Gantt charts allow deduction of critical path

(ii) up to **three** points from:

- PERT chart Project Evaluation and Review Technique
- PERT charts show milestones (in their correct order) if not given in (i)
- events are numbered sequentially
- events are linked by activities
- PERT charts show the critical path(s)/ shows shortest path for project completion (if not given in (i))

Max 4 points overall   [4]

(b) type of software
one mark

- project management software/spreadsheet

description or **example of use**
one mark e.g.

- identifies tasks that must be completed on time
- easy updating of Gantt or PERT charts etc.   [2]

(c) For each of **two** methods:
one mark per method
one mark for identifying how the method will be used for this case study
one mark for a further explanation.

Method	- questionnaires
Use	- produce series of questions to give to patients/receptionists/doctors

- no need for analyst to be present can leave questionnaires to be completed and collect later
- responses can be anonymous etc.

Method	- interviewing/meetings
Use	- ask receptionists/doctors a number of face to face questions

- allows questions to be tailored to the individual
- allows follow up questions to be asked etc.

Method	- document search	
Use	- gather information from documents/paperwork used in appointment booking system	
	- allows procedures to be studied first hand	
	- allows close scrutiny of all paperwork/files etc.	
Method	- observation (not doctors)	
Use	- watch receptionists doing their day to day tasks//patients arriving for their appointments	
	- gives first hand knowledge of how system works etc.	[6]

(d) For each of **two** items:
one mark per item of hardware
one mark per reason why it would be needed

Item	- Network Interface Card	
Reason	- to allow a computer to access the network	
Item	- hub	
Reason	- connects segments of a LAN	
Item	- switch	
Reason	- connects segments of a LAN (with reduced data collisions)	
Item	- server	
Reason	- various functions print, file etc.	[4]

(e) **(i)** up to **four** points

- appropriate screen title
- offered both male and female
- confirm and try again
- navigation buttons
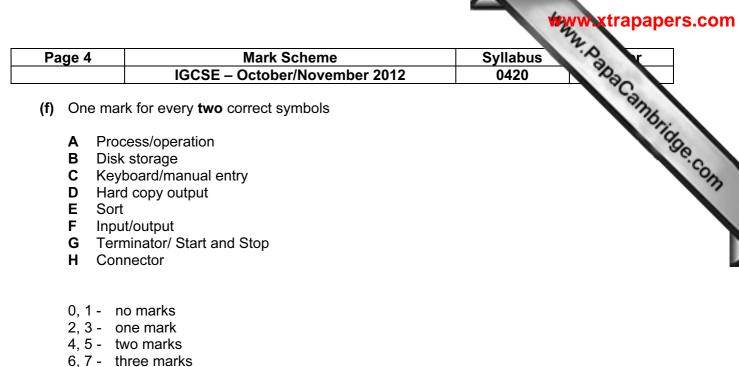- clarity of instructions
- good layout

(ii) up to **four** points

- appropriate screen title
- offered all 31 days
- can see all days of the month clearly

If not given in (i)
- confirm and try again
- navigation buttons
- clarity of instructions
- good layout

Max 4 per screen, 8 in total [8]

(f) One mark for every **two** correct symbols

 A Process/operation
 B Disk storage
 C Keyboard/manual entry
 D Hard copy output
 E Sort
 F Input/output
 G Terminator/ Start and Stop
 H Connector

 0, 1 - no marks
 2, 3 - one mark
 4, 5 - two marks
 6, 7 - three marks
 8 - four marks   [4]

(g) **One** mark per process, max 4

 - Checking patient number and password
 - Selection of doctor
 - Offering appointment
 - Selection of appointment
 - Sorting and printing out/displaying list of appointments for a doctor

 One mark per input, max 2

 - Patient Number
 - Password
 - Selection of Doctor
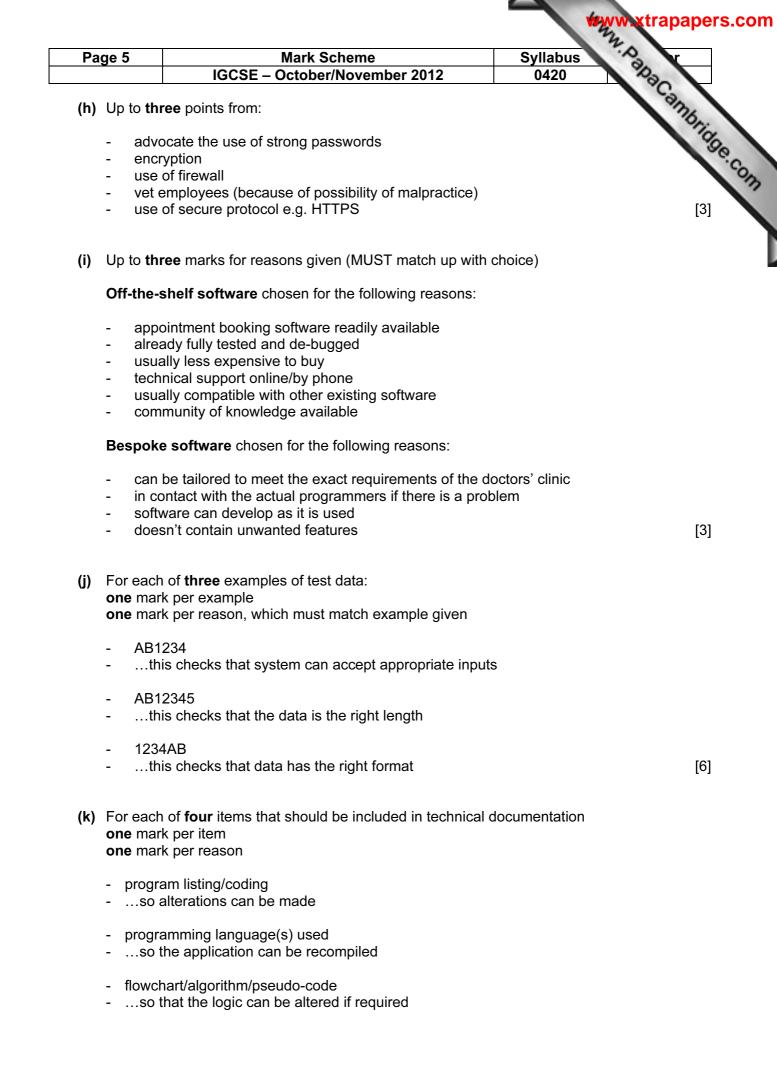 - Selection of appointment time/date

 One mark per data store, max 2

 - Patient file/database
 - Appointment file/database
 - Doctor file/database
 - Database (only if none of the above were given)

 One mark per output, max 2

 - appointment (screen not paper)
 - lists for each doctor (screen or paper)   [8]

(h) Up to **three** points from:

- advocate the use of strong passwords
- encryption
- use of firewall
- vet employees (because of possibility of malpractice)
- use of secure protocol e.g. HTTPS   [3]

(i) Up to **three** marks for reasons given (MUST match up with choice)

Off-the-shelf software chosen for the following reasons:

- appointment booking software readily available
- already fully tested and de-bugged
- usually less expensive to buy
- technical support online/by phone
- usually compatible with other existing software
- community of knowledge available

Bespoke software chosen for the following reasons:

- can be tailored to meet the exact requirements of the doctors' clinic
- in contact with the actual programmers if there is a problem
- software can develop as it is used
- doesn't contain unwanted features   [3]

(j) For each of **three** examples of test data:
one mark per example
one mark per reason, which must match example given

- AB1234
- …this checks that system can accept appropriate inputs

- AB12345
- …this checks that the data is the right length

- 1234AB
- …this checks that data has the right format   [6]

(k) For each of **four** items that should be included in technical documentation
one mark per item
one mark per reason

- program listing/coding
- …so alterations can be made

- programming language(s) used
- …so the application can be recompiled

- flowchart/algorithm/pseudo-code
- …so that the logic can be altered if required

- System flowchart
- …to give overview of whole system

- Data Flow Diagram
- …to show movement of data through the system

- hardware requirements/ allow example such as memory requirement
- …for testing any alterations

- software requirements
- …for testing any alterations

- known "bugs" in the system
- …so they can be removed

- list of variables used (and their meaning/description)/data dictionary
- …so that alterations don't spawn new errors

- file structures
- …so that files and file sizes can be checked

- sample runs/test plan/testing (with results and actual test data used)
- …so that tests can be re-run when alterations are made

- validation rules
- …so that any extra inputs can be subject to similar validation

- input/output formats
- …so that any extra ones/alterations can follow the same format   [8]

(l)   **One** mark for each of **two** methods
      One mark for each reason given to a maximum of **two**, which must match chosen method

      Direct changeover
      -   no need to run 2 systems side by side
      -   immediate benefits from new system
      -   less disruptive for receptionists/doctors
      -   more likely to work since it will have been fully tested first

      Parallel implementation
      -   operate both systems together side by side
      -   good for training receptionists/doctors since both systems can be compared
      -   if **new system fails** have **old manual system** as a back up

      Pilot implementation
      -   adopt new system at one clinic
      -   can easily re-introduce old system if problems occur
      -   makes sure system fully works before adopting at another clinic

      Phased implementation e.g.
      -   part of system (e.g. patient arrivals) introduced initially for trials
      -   if it is OK, gradually introduce other parts of the new system
      -   if a problem occurs, can stop using it any stage
      -   allows receptionists/doctors to gain confidence in its operation   [4]