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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Computing 2510

COMP2 Computer Components, The Stored Program Concept and The Internet

Mark Scheme

2010 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.

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Registered address: AQA, Devas Street, Manchester M15 6EX *Dr Michael Cresswell Director General*

Notation used mark schemes:

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

<table>
<tr><th>Qu</th><th>Part</th><th>Sub Part</th><th>Marking Guidance</th><th>Mark</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><th></th><th>URL</th><th>Domain Name</th><th>IP Address</th><th>Protocol</th></tr>
<tr><td>(i) http://www.guineas.co.uk</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>(ii) 212.58.251.195</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td>(iii) guineas.co.uk</td><td></td><td>✓</td><td></td><td></td></tr>
</table>
1 mark for each correctly placed tick
R Answers with more than one tick on a row.</td><td>3</td></tr>
<tr><td>1</td><td>(b)</td><td></td><td>To translate/convert/resolve domain names into IP addresses;
A FQDN for domain name
Answer must have the CONCEPT of an action
NE To store the domain names and IP Addresses
NE To access the web page without knowing the IP address
NE To link the domain name to the IP address</td><td>1</td></tr>
</table>

2			**ALGEBRAIC SOLUTION:** **Method 1** $\overline{A \cdot B} + A$ $= \overline{A} + \overline{B} + A$ $= 1 + \overline{B}$ $= 1$ **Method 2** $\overline{A \cdot B} + A$ $= \overline{A \cdot B \cdot \overline{A}}$ $= \overline{0 \cdot B}$ $= \overline{0}$ $= 1$ **1 mark** for an application of a DeMorgan's law **1 mark** for realisation that $A + \overline{A} + B = 1 + B$ or $\overline{0}.B = \overline{0}$ (must be written in method, not just inferred that student has done this if arrives at correct answer) **1 mark** for correct answer **TRUTH TABLE SOLUTION:** **X** **Y** **Z** A B $A \cdot B$ $\overline{A \cdot B}$ $\overline{A \cdot B} + A$ 0 0 0 1 1 0 1 0 1 1 1 0 0 1 1 1 1 1 0 1 **1 mark** for column Y correct **1 mark** for column Z correct **1 mark** for correct answer **ANY OTHER METHOD:** If student has used any other method to arrive at correct answer then award marks as follows: **1 mark** for correct answer, no working out **2 marks** for correct answer with working out, not all steps shown. **3 marks** for correct answer with all steps of working out shown. **A** True for 1, False for 0 **A** alternative notations : • For $X \cdot Y$ allow X AND Y, $X \wedge Y$, $X \cap Y$, XY • For X+Y allow X OR Y, $X \vee Y$, $X \cup Y$ • For $\overline{X}$ allow NOT X, $\neg X$	3
3	(a)		Program Counter; **A** Sequence Control Register **R** Next Instruction Register Current Instruction Register; **A** Instruction Register Memory Buffer Register; **A** Memory Data Register Memory Address Register; **MAX 2**	2

3	(b)		Address in MAR/address to fetch instruction from, sent down Address Bus to Main Memory; **R** address in PC (program counter) Contents of address accessed in Main Memory; **A** by implication if contents of address location referred to during data transfer Contents of address location//instruction//data passed down Data Bus into MBR/to processor; **A** MDR instead of MBR **A** RAM for Main Memory **MAX 2**	2
3	(c)		Order of execution unimportant/one step does not rely on prior completion of the other; Steps carried out by different (hardware) devices/components; **A** operations are independent **A** operations use different registers **R** using different buses **MAX 1**	1
4	(a)		So that source code cannot be accessed by users; Users do not need to have an interpreter/compiler/translator//users do not need programming environment; Users do not need knowledge of the programming environment; So that the program will execute more quickly; **NE** it's faster **NE** does not need to be compiled each time executed/run **R** saves disk space **MAX 2**	2
4	(b)		Can't know what type of processor will be in user's computer//Internet users have range of computers/devices with different processors; A compiled program will only execute on a processor of specific type/family/with same instruction set//A program run using an interpreter can execute on a computer with any type of processor; **A** References to just different types of computer/device rather than specifically processors **NB** Virtual Machine **R** No compiler exists **R** computers may have different web browsers/software	2
5	(a)	(i)	LOAD = Opcode 4 = Operand **1 mark** for both parts correct	1
5	(a)	(ii)	A storage/memory location in the <u>processor</u>; **A** CPU **NE** location in the processor	1

5	(b)		`LOAD 12;`
			`ADD 13;`
			`STORE 14;`
			A operands 12 and 13 swapped around BUT NOT swapped opcodes
			A correct binary operands 12- 1100 13- 1101 14- 1110
			A minor spelling errors in Opcode only
			P1 for use of # or other symbols with operand
			Penalise each additional unnecessary instruction (beyond 3)by 1 mark
				3

6			*General purpose software-* • Carries out many different tasks/variety of tasks; **A** more than one task **NE** tasks • Any reasonable example e.g. word processor, spreadsheet; *Bespoke software-* • Bespoke; • Written to a particular customer's requirements/needs; • Example of bespoke software package must clearly have been made for a particular organisation or is implicit from the application (likely to be very large scale or hardware related); n.b. stock control system **NE** where as stock control system for particular company is correct *Special purpose software-* • Special purpose; • Carries out one/a specific/particular task; **A** just one task • Any reasonable example e.g. stock control, accounting, route planning, web browser, air traffic control; **R** anti-virus *General points-* • Off-the-shelf // immediate availability for either general purpose or special purpose//bespoke is NOT immediately available/not off the shelf; (once only) • If contradictory examples for any class of software T.O.	

Mark Bands and Description	
5-6	*To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of language criteria (QLx).* *SUB* Candidate has made at least 5 relevant points, including at least one from each type of software. *QL1* Text is legible. *QL2* There are few, if any, errors of spelling, punctuation and grammar. Meaning is clear. *QL3* The candidate has selected and used a form and style of writing appropriate to the purpose and has expressed ideas clearly and fluently. *QL4* Sentences and paragraphs follow on from one another clearly and coherently. *QL5* Appropriate specialist vocabulary has been used.

			Mark Bands and Description 3-4 *To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of language criteria (QLx).* *SUB* Candidate has made at least 3 relevant points, including at least one point from two different types of software *QL1* Text is legible. *QL2* There may be occasional errors of spelling, punctuation and grammar. Meaning is clear. *QL3* The candidate has, in the main, used a form and style of writing appropriate to the purpose, with occasional lapses. The candidate has expressed ideas clearly and reasonably fluently. *QL4* The candidate has used well-linked sentences and paragraphs. *QL5* Appropriate specialist vocabulary has been used. 1-2 *To achieve a mark in this band, candidates must meet the subject criterion (SUB). The quality of language should be typified by the QLx statements.* *SUB* Candidate has made at least 1 relevant point. *QL1* Most of the text is legible. *QL2* There may be some errors of spelling, punctuation and grammar but it should still be possible to understand most of the response. *QL3* The candidate has used a form and style of writing which has many deficiencies. Ideas are not always clearly expressed. *QL4* Sentences and paragraphs may not always be well-connected or bullet points may have been used. *QL5* Specialist vocabulary has been used inappropriately or not at all. 0 Candidate has made no relevant points. Note: Even if English is perfect, candidates can only get marks for the points made at the top of the mark scheme for this question. **If a candidate meets the subject criterion in a band but does not meet the quality of language criteria then drop mark by one band, providing that at least 3 of the quality of language criteria are met in the lower band. If 3 criteria are not met then drop by two bands.**	6
7	(a)		1; **A** True 1; **A** True 0; **A** False	3
7	(b)	(i)	AND and NOT	1
7	(b)	(ii)	NAND // NAND gate **R** NOT AND	1

7	(c)		Minimise cost of production; Reduce propagation delay//speed up processing; Minimise heat generated; Reduce power consumption; **NE** simpler to produce/makes circuit simpler **NE** reduce number of gates in chip	1

8	(a)		Set of rules/agreed signals/agreed codes (for data exchange between systems) **R** instructions	1

8	(b)		(i) Managing a server remotely. — Telnet/SSH/SSH2/RSH **A** HTTP/HTTPS if not used in (iii) or (iv) (ii) Retrieving email from an e-mail server. — POP/IMAP/POP*n*/IMAP*n* where *n* is a number from 1-4 **A** P-IMAP/Push IMAP **A** Telnet if not used in (i) **R** SMTP (iii) Viewing a sports news web page using a web browser. — HTTP (iv) Accessing your online bank account using a web browser — HTTPS **R** SHTTP **A** full names of protocols **DO NOT ALLOW SAME ANSWER MORE THAN ONCE**	4

9	(a)		**For Photodiode System:** Light/laser/LED/Infra-red light shone at bar code; **NE** beam (Moving) mirror/prism moves light beam across bar code//user moves reader across bar code; **NE** beam Light reflected back; Black/white bands reflect different amounts of light // black reflects less light // white reflects more light; Light sensor/photo sensor/photo diode/CCD measures amount of reflected light; Light reflected converted into an electrical signal; **A** convert reflection to (binary) numbers/characters (Electrical form of) reflection analysed to determine value encoded in bar code; Data transmitted as binary codes to till/computer; These values are often sent as ASCII codes; **For Camera/CCD System:** Camera/CCD measures (ambient) light reflected from bar code; Camera/CCD converts light into an electrical signal; Light reflected back; Black areas reflect less light than white; Raw image data transmitted to computer; Image analysis software analyses image to determine value encoded in bar code; **MAX 4**	4

9	(b)		Validate data entry//check bar code is valid/reasonable; Verify if bar code has been "input" accurately/correctly //check bar code not damaged/altered; **R** validate the item **MAX 1**	1

9	(c)		Keyboard/Keypad/Touch screen/Concept Keyboard/Electronic Scales **NE** scales	1

10	(a)		Introduction to Storage Devices **Types of Magnetic Storage Device** Some common magnetic storage devices are: • Floppy Disk Drive • Hard Disk Drive • Magnetic Tape Data can also be stored optically. **1 mark** for correct title "Introduction to Storage Devices", clearly in title bar at top; **R** text just labelled as title **1 mark** for "Type of Magnetic Storage Device" in bigger size than rest of text; **1 mark** for correct list of items in a bulleted and indented list; **1 mark** for 3 blank lines in correct places, i.e. under "Types" line and above and below bulleted list; **1 mark** for underlining optically **A** if the full stop is also underlined; **1 mark** for labelling hyperlink as being to "optical.htm" **1 mark** for starting both paragraphs (beginning with "Some" and "Data" on the left hand side of a new line. **I** Misspellings that don't affect the clarity of the layout. Where layout not clear, be guided by any labels unless labels contradict apparent layout in which case **TO**. **P1** any extra text/symbols other than browser controls **MAX 6**	6
10	(b)	(i)	The page/body will have a yellow background/be yellow; **NE** background will be yellow	1
10	(b)	(ii)	No effect;	1
10	(b)	(iii)	The heading (in size 1)//The text between H1 tags//"Types of Magnetic Storage Device" will be centred; **A** in middle/centre of line/page **R** Header for heading	1
11	(a)	(i)	Copyright, Designs and Patents **A** Copyright	1
11	(a)	(ii)	Computer Misuse	1
11	(a)	(iii)	Health and Safety at Work **A** Health and Safety	1

11	(b)	(i)	Rules that an employee must follow//a member of an organisation is bound by; **NE** agreement **R** Laws alone instead of rules Usually a (written) document/contract; Contents of a code (may) not be legal requirement; Breaking rules could result in disciplinary action/possibility of losing job; **MAX 2**	2

11	(b)	(ii)	To set out points of good practice for employees//set out rules that are not legal requirements; To ensure employees are aware of legal requirements//as employees may not know what the law is; To relate legal requirements to the work that the employee does; To make clear consequences of breaking the rules *if mark not already awarded in b(i)* **A** to exonerate the company if law is broken **MAX 2**	2