

**Cambridge International Examinations** Cambridge International Advanced Level

#### **COMPUTER SCIENCE**

9608/32 October/November 2016

Paper 3 Written Paper MARK SCHEME Maximum Mark: 75

Published

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Syllabu 9608		Paper 32 [3]
9608		<b>32</b> [3]
		[3]
		[1] [1]
		[Max 3]
		[3]
f.t.		[1] [1]
		[Max 3]
		[3]
		[1] [1]
		[Max 3]
		[1]
		[1]
	1	1
1 1	1	[1] [1]
-	f.t. 1 1	f.t. 1 1 1

Ра 2	ige 3		Mark Cabama				
2			Mark Scheme			Syllabus	Paper
2		Cambridge Interna	tional A Level – C	ctober/Nove	mber 2016	9608	32
	(a)	Statement		Compilatio	n stage		
	- 1 2	This stage can improve the time taken to execute the statement: x = y + 0		Lexical an	alysis		
	-	This stage produces object code.		Syntax an	alysis		1 mark for each correct
	-	This stage makes use of tree data structures.		Code gene	eration		line
	- - !	This stage enters symbols in the symbol table.		Optimisa	tion		
	(b)	PQ+	I				[4] [1]
	(c)	(i)		2			[1]

					V \				
				3	3	5			4
	2		1	1	1	( 1	6		mark
2	2	4	4	4	4	4	4	(-2)	perning
	*				+	+	_		
									[4]

(ii)	b*a	[1]
	– (c + d + a)	[1]
	Order must be correct for both parts	

(iii) Rules of precedence means different operators have different priorities // by example multiply is done before add [1]
 In RPN evaluation of operators is left to right // operators are used in the sequence in which they are read [1]
 No need for brackets // infix may require the use of brackets [1]

<sup>[</sup>Max 2 ]

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Page 4	L I			Mark Scheme	www.aynanno	Syllabus	Paper
		Cambri	dge Internat	ional A Level – Octobe	r/November 2016	9608	32
3 (a)	Th Lo	e page is aded at / s	present in <u>m</u> stored /prese	<u>emory</u> nt in page frame 542 // it	s memory address is	542	[1] [1]
(b)	(i)	Next ins Page 6 i Instructi Program	truction is firs is not presen on can only t n cannot cont	st instruction in Page 6 t in memory be executed if present in tinue until Page 6 is load	memory ed		[1] [1] [1] [1]
							[Max 2]
	(ii)	When th A page this gen ISR cod Causes	here is an atte fault occurs / erates an inte e is executed the OS to loa	empt to load an instructio / Page 5 finishes … errupt 1 ad page 6 into memory	on for a page not in m	emory	[1] [1] [1] [1] [1]
							[Max 3]
(c)	(i) (ii)	Time of	entry (NOT t	ime in memory)			[1]
	( )	Page	Presence Flag	Page frame address	Additional data		
		6	1	221	12:07:34:49		[1 + 1 + 1]
(	(iii)	When th	he procedure	call is made – Page 1 is	swapped out and Pa	ge 3 is swar	oped in [1]

 At the end of the procedure call – Page 3 is swapped out and Page 1 is swapped in [1]

 Page 1/3 is always in memory shortest amount of time

 The entire sequence is repeated for every iteration

### [Max 3]

[1]

(iv) Thrashing //  $\underline{continually}$  swapping pages

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Pa	ige 5	Mark Scheme	Syllabus	Paper
		Cambridge International A Level – October/November 2016	9608	32
4	(a) (i)	A set of rules governing communications/transmission of data /sending and receive	ing data	[1 [1
	(ii)	For example, (Web) browser / email client		[1
	(iii)	For example, Web server / email server		[1
	(iv)	Security //example: for example, alteration of transmitted messages Privacy // for example, only intended receiver can view data Authentication // for example, trust in other party		[1 [1 [1
				[Max 2]
	(b) For whi	example: ich protocol will be used there are a number of different versions of the two protocols		[1 [1
	ses ses enc aut	uniquely identifies a related series of messages between server and ssion type reusable or not cryption method public / private keys to be used // asymmetric/ symmetric hentication method	client	[1 [1 [1 [1 [1 [1 [1]

[Max 2 parameters]

[Max 4]

(c) For example:

secure file transfer	[1]
	[Max 2]

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Page 6	Mark Scheme	Syllabus	Paper
	Cambridge International A Level – October/November 2016	9608	32

#### 5 (a) (i)

I	npu	t	Working space	Out	put
Ρ	Q	R		J	K
0	0	0		0	0
0	0	1		0	1
0	1	0		0	1
0	1	1		1	0
1	0	0		0	1
1	0	1		1	0
1	1	0		1	0
1	1	1		1	1

1 mark each column

If zero marks then 6 or 7 pairs correct – 1 mark

[2]

[1]

[1]

(ii)	Full adder	[1]
(iii)	C / Carry S / Sum represents the carry part of the addition of three bits represents the sum part of the addition of three bits	[1] [1] [1] [1]

**(b) (i)** A.

(A+B).C

(ii) Allow follow through from (b)(i)

A. ((A+B).C) = A.(A.C + B.C) = A.A.C + A.B.C = A.C + A.B.C = A.C (1 + B) = A.C.1 = A.C

1 mark for each correct simplification line – max 3 [3] 1 mark for A.C if correct answer to part **(b)(i)** [1]

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Ρ	age 7		Mark Schem	le	Syllabus	Paper
		Cambridge In	ternational A Level –	October/November 2016	9608	32
6	(a)					
		Computer A	Computer B	Server		<b>4</b> ×
	Ĺ				С	omputer to Switch [1]
		Computer C	Computer D	Switch		Server to Switch [1]

(b)

Statement	True	False
All packets must be routed via the server.		~
Computer B can read a copy of the packet sent from the Server to Computer A.		~
No collisions are possible.	~	

(c)	(i)	Router / Switch / Bridge	[1]
	(ii)	Router uses IP addresses in making decisions Router has routing table Routing table has entry for associated network ID // routing table has entry for host address // routing table used to make decision on where to route packet	[1] [1]
			[1]
		Switch / Bridge use MAC addresses MAC address table created Switch / bridge use MAC address table to make decision on where to route packet	[1] [1] [1]

## [Max 2]