

QUESTION 1.

Mark Scheme

Cambridge IGCSE – May/June 2016



- 1 compiler
assembler
interpreter

2

Application	Sensor
<i>controlling street lights</i>	Light
<i>monitoring a river for pollution</i>	Gas, pH, temperature, light
<i>controlling traffic lights</i>	pressure, magnetic field,

NOTE: The same sensor cannot be given twice

[3]

- 3 (a) 1 mark for each nibble

0100 1010 1111

[3]

- (b) (i) 0 1 1 0 1 0 0 1 105 hours 1 mark
0 0 0 1 1 1 1 1 31 minutes 1 mark
0 0 1 1 0 0 1 0 50 seconds 1 mark

[3]

- (ii) 1F

[1]

QUESTION 2.

0478/13

Question	Answer				Marks
9	Statement	Assembler (✓)	Compiler (✓)	Interpreter (✓)	3
	Translates high-level language into machine code		✓	✓	
	Provides error diagnostics	✓	✓	✓	
	Translates whole program to object code in one operation	✓	✓		
	Translates and executes one line of code at a time			✓	
	1 mark for each correct column				

Question	Answer	Marks
10	Any six from: – Program counter (PC) holds address / location of the instruction – The address held in PC is sent to MAR – Address is sent using address bus – PC is incremented – The instruction is sent from address in memory to MDR – Instruction is transferred using the data bus – Instruction sent to CIR	6

QUESTION 3.

0478/12

Question	Answer	Marks
1(a)	Any three from: – MAR – MDR // MBR – PC // IAR // NIR // SCR – ACC – CIR // IR – IAS	3
1(b)(i)	– Fetch – Execute	2
1(b)(ii)	– Control unit	1

Question	Answer	Marks
2(a)	Any four from: – To translate the high-level language into low-level language – Interpreter used whilst writing the program – Interpreter used to debug code line by line – Compiler used when program completed – Compiler used to create separate executable file (so compiler no longer needed) – If it runs first time in a compiler there are no syntax errors	4
2(b)	Any three from: – Easier to understand // Don't know assembly code – Easier to debug – Easier to maintain – Portable – Knowledge of manipulating memory locations/registers not required – Can use an IDE – Greater range of languages	3

Question	Answer	Marks
3(a)	Any four from: – Encryption key is used – Encryption algorithm is used – Encryption key / algorithm is applied to plain text – ... to convert it into cypher text – Same key is used to encrypt and decrypt the text	4
3(b)	Any three from: – Firewall – Password – Proxy server – Physical methods (by example e.g. CCTV, Locks) – Access rights – <u>Asymmetric</u> encryption – Disconnect from network	3

Question	Answer	Marks
4(a)(i)	– NAND 	2
4(a)(ii)	– NOR 	2

QUESTION 4.

Mark Scheme

Cambridge IGCSE – October/November 2016



9 Any **six** from:

- infrared / motion / pressure (sensor) // sensor detects movement/pressure
- signals/data sent (continuously) to microprocessor
- converted from analogue to digital (using ADC)
- microprocessor compares value with those stored in memory
- if sensor value does not match the stored value(s) ...
- ... signal sent to switch on the light
- ... signal sent to keep the light on
- ... light remains on for a period of time (30 seconds)
- if sensor value matches the stored value(s) ...
- ... light will remain off
- ... will turn off after period of time (30 seconds)
- works in a continues loop

[6]

10 (a) (i) 2 marks for 3 correct binary conversions, 1 mark for 2 correct binary conversions

[2]

0	0	0	1	1	0	1	0	1	1	1	1
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(ii) 1 mark for each correct hex value converted

1 A F

[3]

(b) 2 marks for working + 1 mark for correct answer

Working

- $1200 \times 8 = 9600$ (bytes)
- $9600/1024$ or $9600/1000$

Answer

- 9.4 or 9.6 kilobytes

[3]

(c) Any **one** from:

MAC address

- Media Access Control (address)
- unique number that identifies a device (connected to the Internet)
- address is made up of manufacturer id + serial number of device
- address is allocated by the manufacturer

Any **one** from:

IP address

- Internet Protocol (address)
- location/address of a device on the Internet
- address is unique for given Internet session
- address is supplied when a device connects to the Internet
- address is allocated by the network

[2]

QUESTION 5.

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1 (a) Any **two** from:

- direct access to computer processor / special hardware // machine dependent instructions
- uses up less memory
- can increase the speed of processing a program // executes instructions faster

[2]

(b)

Statements	Interpreter (✓)	Compiler (✓)
Translates the source code into machine code all at once		✓
Produces an executable file in machine code		✓
Executes a high-level language program one instruction at a time	✓	
Once translated, the translator does not need to be present for the program to run		✓
An executable file is produced		✓

[5]

2 Any **four** from:

- Provides a user interface
- Handles interrupts / errors
- Memory management
- File management
- Manages peripherals (inputs/outputs)
- Provides security methods
- Allows multitasking
- Manages multiprogramming
- Enables batch processing
- Manages software installation / removal
- Allows creation of multiple accounts
- Levels of access

[4]

QUESTION 6.

0478/11

Question	Answer			Marks
10	1 mark for each correct tick			6
	Statement	true (✓)	false (✓)	
	Assembly language uses mnemonic codes.	✓		
	Assembly language programs do not need a translator to be executed.		✓	
	Assembly language is a low-level programming language.	✓		
	Assembly language is specific to the computer hardware.	✓		
	Assembly language is machine code.		✓	
	Assembly language is often used to create drivers for hardware.	✓		

Question	Answer	Marks
6(a)	• Compiler • Interpreter	2
6(b)	Four from: • Closer to human language/English ... • ... so it is easier/quicker to read/write/understand • ... so it is easier/quicker to debug the program • ... therefore, less likely to make errors • The program can be used on many different platforms ... • ... because it is written in source code • ... because it is compiled into object code • They have built-in functions/libraries ... • ... this saves time when writing the program • Do not need to manipulate memory addresses directly ... • ... therefore, specialist knowledge of this is not required • Only need to learn a single language ... • ... as this can be used on many different computers	4

Question	Answer				Marks
6(c)	1 mark for each correct tick (✓)				3
	Computer code	High-level language (✓)	Assembly language (✓)	Machine code (✓)	
	10110111 11001100 01011100			✓	
	FOR X = 1 TO 10 PRINT X NEXT X	✓			
	INP X STA X LDA Y		✓		

Question	Answer	Marks
7	1 mark for each correct line (to a maximum of 5) Browser Internet Service Provider (ISP) Hypertext Transfer Protocol (HTTP) Uniform Resource Locator (URL) MAC address IP address A program that allows a user to view webpages The main protocol that governs the transmission of data using the Internet The website address that is typed into the address bar An address given to each device on a network. It is provided by the network A unique address given to a device on a network. It is provided by the manufacturer A company that provides a connection to access the Internet	5