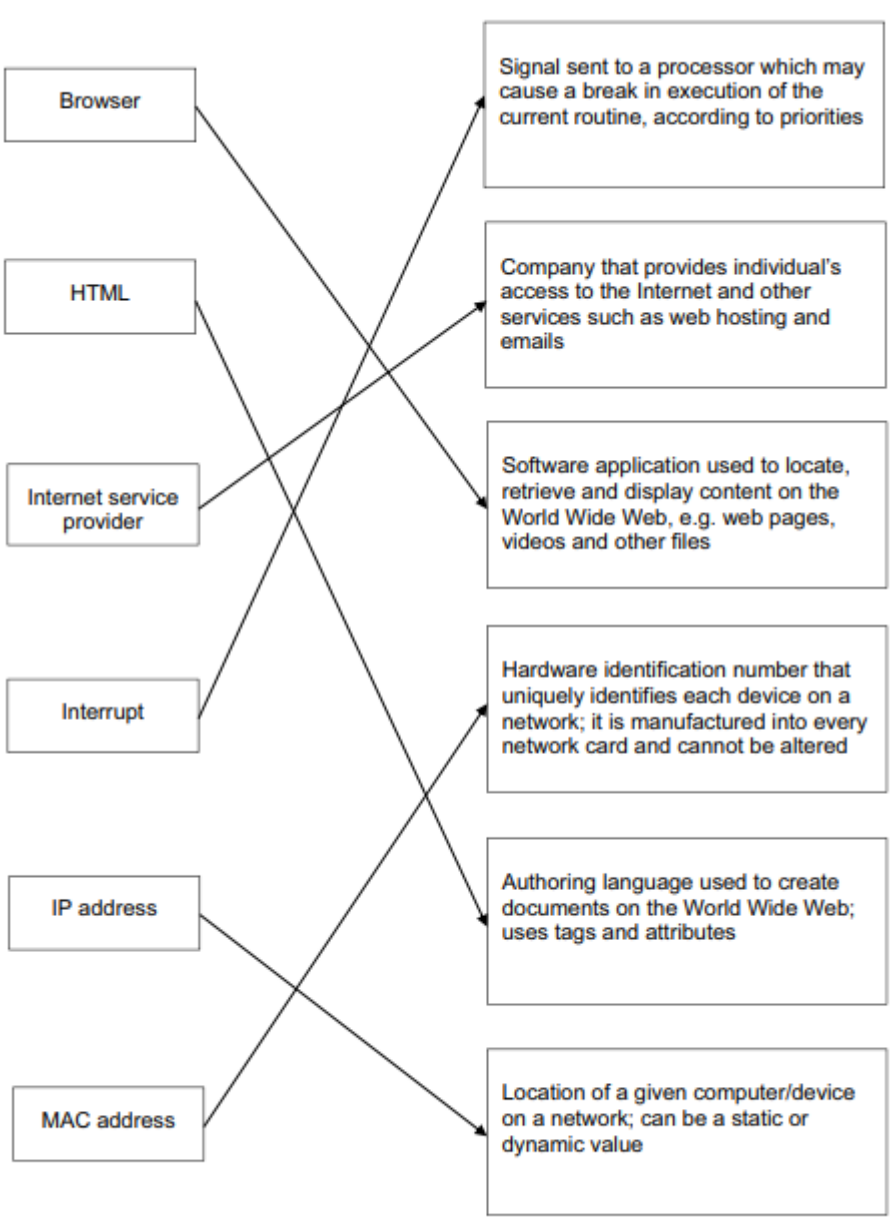
3. Hardware

3.4 Network hardware

Marking Scheme

Q1)


Browser
HTML
Internet service provider
Interrupt
IP address
MAC address
Signal sent to a processor which may cause a break in execution of the current routine, according to priorities
Company that provides individual's access to the Internet and other services such as web hosting and emails
Software application used to locate, retrieve and display content on the World Wide Web, e.g. web pages, videos and other files
Hardware identification number that uniquely identifies each device on a network; it is manufactured into every network card and cannot be altered
Authoring language used to create documents on the World Wide Web; uses tags and attributes
Location of a given computer/device on a network; can be a static or dynamic value

[5]

Q2)

(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

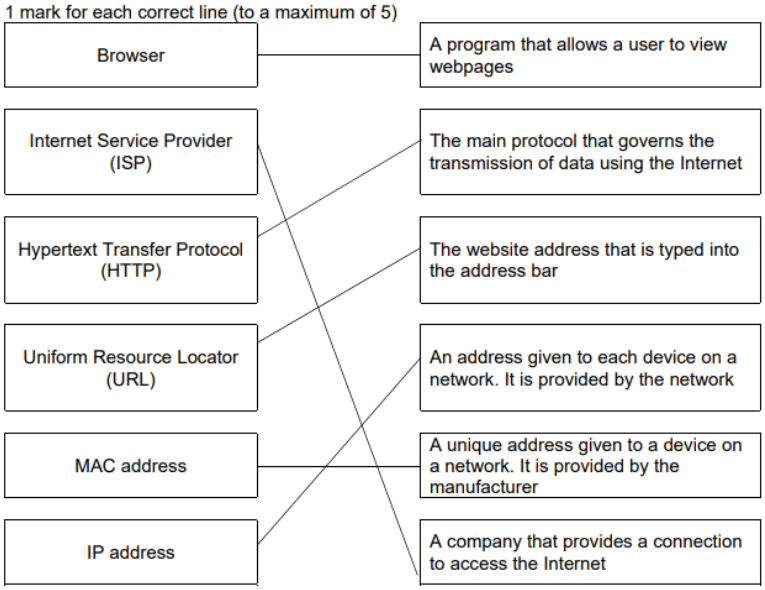
- Internet Protocol (address)
- location/address of a device on the Internet
- address is unique for given Internet session
- address is supplied when a device connects to the Internet
- address is allocated by the network [2]

(d)
- record (layer)
- handshake (layer) [2]

Q3)

Question	Answer	Marks
	1 mark for each correct answer, in the given order: ∞ browser ∞ webpages ∞ Internet Service Provider (ISP) ∞ Internet ∞ protocol ∞ IP address	6

Q4)

Question	Answer	Marks
	1 mark for each correct line (to a maximum of 5)  	5

Q5)

(b)	**Four** from: • Media Access Control (address) • Used to identify a device • It is a **unique** (address) • It is a static address // It does not change • It is set by the manufacturer • The first part is the manufacturer ID/number/identifies the manufacturer • The second part is the serial number/ID	4

Q6)

Question	Answer	Marks
(d)	1 mark for each correct term, in the correct place: – URL – https – Domain name – Web server – Browser – HTML	6

Q7)

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>(a)</td><td>1 mark for each correct row:
<table>
<tr><th>Statement</th><th>True (✓)</th><th>False (✓)</th></tr>
<tr><td>A MAC address is unique to a computer on a network</td><td>✓</td><td></td></tr>
<tr><td>Once an IP address has been set it cannot be changed</td><td></td><td>✓</td></tr>
<tr><td>A MAC address is made up of the computer's serial number and the IP address</td><td></td><td>✓</td></tr>
<tr><td>If a computer does not have an IP address it cannot communicate with another device using the Internet</td><td>✓</td><td></td></tr>
</table></td><td>4</td></tr>
</table>

Q8)

(c)(i)	Any **one** from: – Media access control – Unique address given to each device	**1**
(c)(ii)	Any **three** from: – Uses hexadecimal values – Normally 48/64 bits in length (accept any other reasonable value) – First half is manufacturer number/code/ID – Second half is serial number	**3**

Q9)

(b)	**One** mark for each correct term in the correct place: – Control – Unique – Identify – Protocol – Dynamic	**5**

Question	Answer	Marks
(c)	Any **four** from: – Allows user to view web pages – Renders HTML – Allows user to bookmark/favourite web pages – Provides navigation features – Allows (multiple) tabs – **Stores** cookies – Records history of pages visited – Has a homepage – Runs active script – Allows **files** to be downloaded from **website/internet** – Sends a request to the **IP address/web server** (to obtain the contents of a web page) – Sends URL to DNS – **Manages** HTTP/HTTPS protocol	**4**

Q10)

(b)(i)	Any **one** from: – Both addresses can be used to identify a computer/device – Both are unique – Both can be represented as hexadecimal – Both addresses do not change if IP address is static	**1**
(b)(ii)	Any **two** from: – An IP address is assigned by the network/router/ISP, A MAC address is assigned by the manufacturer – An IP address can be changed (if dynamic), MAC address cannot be changed – IP address has 4/8 groups of values, MAC address has 6 groups/pairs of values – IP address is 32-bit/128-bit, MAC address is 48-bit – IP address does not contain serial number/manufacturer number, MAC address does – IP(v4) address is denary and MAC address is hexadecimal	**2**

Q11)

(a)(i)	– manufacturer	**1**

Q12)

Question	Answer	Marks
	Any **three** from: • It is a unique address • It is assigned by the manufacturer • It can be used to identify a device • It contains the manufacturer ID/code/number • It contains the **serial** code/number • It is written in hexadecimal • It has 6 bytes/48 bits/6 pairs of digits • Does not (usually) change // static	**3**

Q13)

Question	Answer	Marks
(a)	Any **two** from: • They are both unique addresses • They can both be used to **identify** a device (on a network) • They are both assigned to hardware • They can both be represented as hexadecimal	**2**
(b)	Any **two** from: e.g. • A MAC address is assigned by the manufacturer, whereas an IP address is assigned by the network/router/ISP • A MAC address is represented as hexadecimal, whereas an IP address can sometimes be represented as numeric • A MAC address is normally static, whereas an IP address can be dynamic • A MAC address has 6 groups of digits, whereas an IP address has 4/8 groups • A MAC address is 6 bytes (48 bit), whereas an IP address is 4/16 bytes (32/128 bit)	**2**

Q14)

Question	Answer	Marks
(a)(i)	• Network interface card/controller // NIC // WNIC	**1**
(a)(ii)	• Media access control/MAC address // MAC	**1**
(b)(i)	• Router	**1**
(b)(ii)	**Three** from: • It can be used to **uniquely identify** a device (on a network) • It can change … • … each time the device is connected to the network	**3**

Q15)

Question	Answer	Marks
(a)	• C	**1**
(b)	**Four** marks from: Any **FOUR** from: • It is denary based • … with numbers between 0 and 255 • It is 32 bits • 4 sets/groups of numbers • … **separated** by dots Any **TWO** from: • It is a **unique** address • It can be **static** or **dynamic** • It can be **public** or **private** • It contains the network prefix • … and the host number	**4**

Q16)

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td></td><td>One mark for each correct missing term or definition:

<table>
<tr><th>Term</th><th>Definition</th></tr>
<tr><td>router</td><td>a device that forwards packets to their correct destinations in a network</td></tr>
<tr><td>IP address</td><td>this address is assigned by the network and used to identify a device on a network</td></tr>
<tr><td>network interface card (NIC)</td><td>this is a component in a device that enables it to connect to a network</td></tr>
<tr><td>MAC address</td><td>this address is assigned by the manufacturer and is used to uniquely identify the device</td></tr>
<tr><td>firewall // proxy-server</td><td>this can be hardware or software based and filters traffic coming into and out of a network</td></tr>
</table></td><td>5</td></tr>
</table>

Q17)

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>(a)</td><td>Any one from:

• They can both be used to identify a device (on a network)
• They can both be static / dynamic
• They are both unique (to a device on a network)
• They can both be assigned by a router
• They can both be public/private</td><td>1</td></tr>
<tr><td>(b)</td><td>Four from:

• IPv4 is usually written as denary
• … IPv6 usually written as hexadecimal

• IPv4 is separated using dots
• … Pv6 is separated using colons

• IPv4 is 32-bit
• … IPv6 is 128-bit

• IPv4 is 4 groups of digits
• … IPv6 is 8 groups of digits

• IPv4 digits are between 0 and 255
• … IPv6 digits are between 0000 and FFFF

• IPv4 all 0s are displayed
• … IPv6 can use double colons to replace repeated groups of 0000

• IPv4 has fewer available unique addresses
• ... IPv6 has more available unique addresses</td><td>4</td></tr>
<tr><td>(c)(i)</td><td>• Domain name server // DNS</td><td>1</td></tr>
<tr><td>(c)(ii)</td><td>• Web browser</td><td>1</td></tr>
</table>

Q18)

Question	Answer	Marks
(a)	**A**	**1**
(b)(i)	An IP address that has numerical values separated by dots that follows the format with a max value of 255 in any xxx xxx.xxx.xxx.xxx Example: 10.245.3.99	**1**
(b)(ii)	Any **two** from: • 128-bit // 16 bytes • Hexadecimal • Separated by colons • Characters in groups of 4 • Has 8 groups of characters • Double colons can be used for sets of (consecutive) zeros (only once)	**2**