MODULE E NETWORKS · E7

# IP addressing and MAC addresses: mark scheme

20 marks · Cambridge 0478 syllabus 3.4.2, 3.4.3(a), 3.4.3(b)

**How to use.** One mark per creditworthy point up to the maximum shown. **/** separates alternative words; **//** separates alternative answers. Words in (brackets) are not needed for the mark. Credit any other valid answer that shows the same understanding.

| QUESTION | ANSWER | MARKS | GUIDANCE |
|---|---|---|---|
| **1(a)**<br>0478 3.4.2 | Media access control | **1** | Spelling must be recognisable. |
| **1(b)**<br>0478 3.4.2 | Any three from:<br>First half // 6E-14-AB is the manufacturer code / ID / number<br>Second half // 90-2C-F7 is the serial code / number<br>Written in hexadecimal<br>12 hex digits // 6 pairs (of hex digits)<br>48 bits // 6 bytes | **3** | max 3. Halves reversed: no credit for either half. |
| **1(c)**<br>0478 3.4.2 | Given at the point of manufacture // when the NIC is made // by the manufacturer<br>Does not normally change // is fixed / permanent | **2** | Do not accept "given by the network / router" or "changes each time it connects". |
| **2(a)**<br>0478 3.4.3(a) | Any two from:<br>Identifies a device on a network // the internet<br>(Allocated by the network) so data can be sent to // reach the correct device / destination<br>Used (by routers) to send data across networks<br>Allows devices to communicate (on a network) | **2** | max 2. Do not accept "to connect to the internet" alone. |
| **3(a)**<br>0478 3.4.3(b) | 128 bits: IPv6<br>Four denary numbers, full stops: IPv4<br>Allocated by the network: Both<br>Eight groups of hexadecimal, colons: IPv6 | **4** | One mark per correct row. More than one tick in a row: 0 for that row. |
| **4(a)**<br>0478 3.4.3(b) | B<br>261 is greater than 255 // each number must be 0 to 255 // 261 cannot be stored in 8 bits | **2** | Second mark only if B is identified. |
| **4(b)**<br>0478 3.4.3(b) | Any two from:<br>IPv4 (is 32 bits so) has a limited number of addresses // about 4.3 billion<br>IPv4 addresses are running out // more devices need addresses<br>IPv6 (is 128 bits so) gives many more addresses | **2** | max 2. Do not accept "faster" or "more secure" alone. |

| QUESTION | ANSWER | MARKS | GUIDANCE |
|---|---|---|---|
| **5(a)**<br>0478 3.4.3(b) | Static: stays the same // does not change (each time the device connects)<br>Dynamic: allocated (by the network / router) when the device connects // can change | **2** | Do not accept "dynamic changes all the time / every second". |
| **5(b)**<br>0478 3.4.3(b) | Static (no mark for choice alone)<br>Any two from:<br>The server's address never changes // is always the same<br>... so the laptops can always find / connect to the server (at the same address)<br>Requests for artwork always reach the server | **2** | max 2. If "dynamic" is chosen, award 0 for the whole part. |

**Total: 20 marks**