MODULE E NETWORKS · E7

IP addressing and MAC addresses: mark scheme

20 marks · OCR J277 spec 1.3.2 (IP addressing and MAC addressing)

How to use. 1 mark per bullet up to the Max shown. **/** separates alternative answers. Words in (brackets) are not needed for the mark. Static/dynamic and public/private IP addresses are not required for J277: give no credit for them, but do not penalise them if the rest is correct.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.3.2	To identify a device / network on a network / the internet (so data can be sent to the right destination)	**1**	Accept: so data can be sent to / reach / be routed to the correct device / network. Do not accept "to connect to the internet" alone.
1(b) J277 1.3.2	IPv4: 32 (bits) IPv6: 128 (bits)	**2**	Accept 4 bytes / 16 bytes.
2(a) J277 1.3.2	192.168.40.17: IPv4 address 3A:7C:19:D2:5E:08: MAC address 10.12.256.3: Not a valid address 2001:0DB8:7A21:0000:0000:3C4F:0912:BE07: IPv6 address	**4**	1 mark per correct row. More than one tick in a row: 0 for that row. Row 3 is not valid because 256 is above 255.
3(a) J277 1.3.2	4 numbers / groups (written in) denary each between 0 and 255 / each 8 bits separated by full stops 32 bits (in total)	**3**	Max 3. Do not accept 1 to 256 / 0 to 256, or colons / hyphens as separators. A correct example (e.g. 192.168.0.1) with no description: Max 1.
3(b) J277 1.3.2	(written in) hexadecimal 12 hex digits / 6 pairs (of hex digits) 48 bits (in total) pairs separated by colons / hyphens	**3**	Max 3. Do not accept denary or binary as the written form. Manufacturer / serial code is not required for J277: no credit, no penalty.

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) J277 1.3.2	The data / packets carry the (destination) IP address (of the office / architect's computer) IP addresses are used (by routers) to route the data between networks / across the internet / WAN ... to the office's network / router Within the LAN, the MAC address is used (to identify the device) The switch uses the MAC address to send the data only to the architect's computer The MAC address is unique to / identifies the computer's NIC / hardware	**4**	Max 4. Max 2 if only IP or only MAC is described. Do not credit answers that swap the roles (e.g. MAC used to route data across the internet).
5(a) J277 1.3.2	IPv4 has a limited number of addresses / about 4.3 billion / 2^{32} IPv4 addresses are running out (as more devices connect) IPv6 (is 128 bits so) gives far more possible addresses	**2**	Max 2. Do not accept "IPv6 is faster" or "more secure" alone.
5(b) J277 1.3.2	IPv6 uses hexadecimal, IPv4 uses denary / IPv6 uses colons, IPv4 uses full stops / IPv6 has 8 groups, IPv4 has 4	**1**	Both sides of the difference, or a clear comparative (e.g. "IPv6 has more groups"). Credit any other valid difference in how they are written.

Total: 20 marks