Answer to the question no-1:

(a) $6 \rightarrow 5 \rightarrow 3 \rightarrow 1 \rightarrow 2 \rightarrow 7 \rightarrow 4$

(b) It will be possible for a new client to download the torrent succesfully because if one peer complete the download then a new client can get the file from other peer in the swarm.

(c) The proxy server will send a conditional Get to origin depending on the cache. If the cache is expired the proxy server will send conditional Get other wise it will serve the content directly.

(d) Stream without buffering is possible due to client buffering ~~one edge caching~~ or optimizing TCP. Player buffers several seconds more of video ahead that doesn't cause stalls and improves throughput.

Answer to the question no-2:

(a) Websites track even if it is not signed up due to the cookies. HTTP is stateless, so cookies give a way to persist user state across multiple HTTP requests and sessions.

(b) Recursive lookups are better from the client perspective because it does the full resolution, so the client does only one query and gets answer. It benefits from caching and reduce global DNS traffic.

(c) I) RTT = 2×23 = 46 ms

II) RTTs to fetch 30 objects,
RTT = 2×39 = 78 ms
For persistent, Total RTT = (1+30) × 78 = 2418 ms
With DNS, Total RTT = 46 + 2418 = 2464 ms

III) Total FTT = 5344 ms
Data = 30 × 12 × 8 = 2880 Mb

$\frac{2880000}{X} + RTT = 5344$

$\Rightarrow \frac{2880000}{X} = 5344 - 2464 = 2880$

$\therefore X = 1000$ Mbps.

Answer to the question no-3:

(a) A server can receive three HTTP request containing the same port number by differentiating between the three requests connections by the socket. If the destination port is same, the source IP will differ.

(b) UDP doesnot offer reliability due to the lack of sequence and acknowledgement number there is no flow control and error control. ~~Applicant~~ Reliability can be added over UDP through error ~~correc~~ correction and checksum. Retransmissions and cumulative acknowledgement can be reliable for UDP.

(c) I) 4th data segment squence number = 2870
Ack number = 9158

II) Seq number = 11,732
Ack number = 8204

III) RWND of the client, total received upto 13^{th} = $13 \times 889 = 11557$ bytes
Processed = $5 \times 889 = 4445$ bytes
Unprocessed = $11557 - 4445 = 7112$ bytes
Remaining = $10000 - 7112$
= 2888 bytes.