DCNDS D59

Question 1.

a) The entire album Queens Greatest Hits is 60 minutes long, and exactly fits onto 1 CD. You want to have customers down-load this from Neat Music Incs. audio browsing server over the Internet as a file, and have stored it as a mono signal, at a sampling frequency of 8kHz, and with a bit resolution of 16 bits. You wish to be able to advertise a best-case time of 30 minutes to down-load, what access speed do you need to have to the Internet? [4 marks]

b) Instead of providing access to music over the Internet as files, Neat Music inc. wants to be able to provide audio via streaming. Discuss the impact of streaming on audio quality versus file transfer, including in your answer a brief description of the reasons for using any particular transport protocol. What access speed to the Internet do any receivers need to have?
[12 marks]

c) You have decided to use compression to widen your potential customer base. You need to provide 2 page report to your immediate boss (who is mostly up-to-date on technical principles) on your recommendations. The criteria that you have to meet in your choice of compression scheme, are that a great many different capabilities of host must be able to decompress the audio in real time. Suggest and describe a suitable compression algorithm, and a suitable software architecture for the player, discussing the reasons for your choice. Recalculate the access speed now needed by your customers in order to listen to the music.
[17 marks]

Question 2.

a) Outline the details of a web transaction showing protocol actions a the user level in browser and server, in HTTP, and at the TCP/IP packet level.
[12 marks]

b) Explain performance problems typical of the web, and outline how demand caching in proxy caching servers helps alleviate this. [12 marks]

c) Under what circumstances could one do with multicasting of web content? how would this help reduce traffic load? [9 marks]

Question 3.

H261 is a part of a family of IT protocols to provide video telephony conferencing standard.

a) Outline the salient parts of the overall architecture o [16 marks]

b) Give a block diagram of the H.261 video codec and explain what the componenets do [10 marks]

c) How is the use of a codec modified to accomodate packet networks?
[7 marks]

Question 4.

Multimedia traffic requires QoS from the network - howeve, many now agree that the level of qos associated with digital circuits is not fully needed. Discuss this argument paying particular attention to mattes such as

a) Playout adaption

b) loss tolerance

c) congestion avoidance

and

d) intra and inter-stream synchronisation

You may find it useful to refer to the RTP protocol format [attached], and the RTCP protocol concepts.
[33 Marks]

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0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|V=2|P|X|  CC   |M|     PT      |       sequence number         |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                           timestamp                           |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|           synchronization source (SSRC) identifier            |
   +=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+
   |            contributing source (CSRC) identifiers             |
   |                             ....                              |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
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Question 5.
The Mbone is a virtual overlay service on the Internet providing multicast packet delive ry.

a) Outline the basic features of the IP multicast model.
[11 Marks]

b) Explain the difference between dense mode (source based trees) and sparse mode (c ore based tree) multicast routing schemes, giving examples of their applicability and advantages and disadvatanges.
[16 Marks]

c) Reliable multicast transport means different things to different people - explain 2 possible services that might be intended (hint - think about ordering].
[6 Marks]