

Department of Electrical and Information Technology

Final Exam – 2011 ht2

2011-12-19, 14:00 – 19:00

## ETSF05/ETSF10 – Internet Protocols

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There are 18 questions in this exam, giving a total of 75 points. Minimum 38 points are needed to get grade 4. Minimum 57 points are needed to get grade 5. You get part of the points for a question if your answer is only partially correct.

Bonus points you might have received from your quizzes are not applicable to this part of the exam.

Use all the time given to you. Answer briefly and clearly. Choose your words carefully in order not to write answers too long. None of the questions requires an answer longer than 100 words; so grading the answer stops after that. Always motivate your answers. Unclear, confused, and too generic answers, containing irrelevant information, will decrease the grading!

If you want, you may use a pocket calculator and a notes page (one side of an A4-size paper, handwritten, which must be handed in with your answer sheets).

*Good luck!*

*Kaan & Jens*

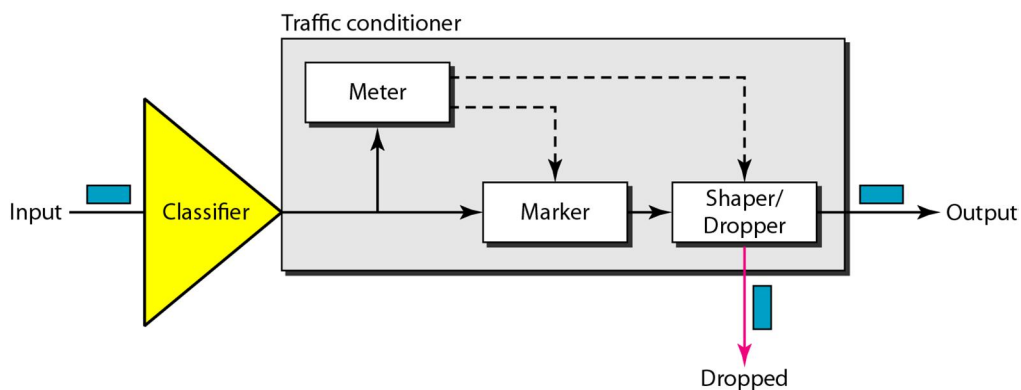
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## Part B

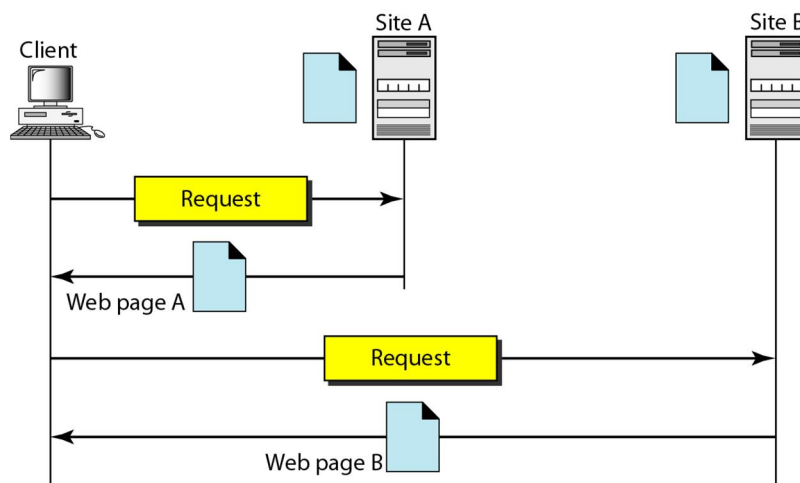
*Questions overleaf...*

## Questions

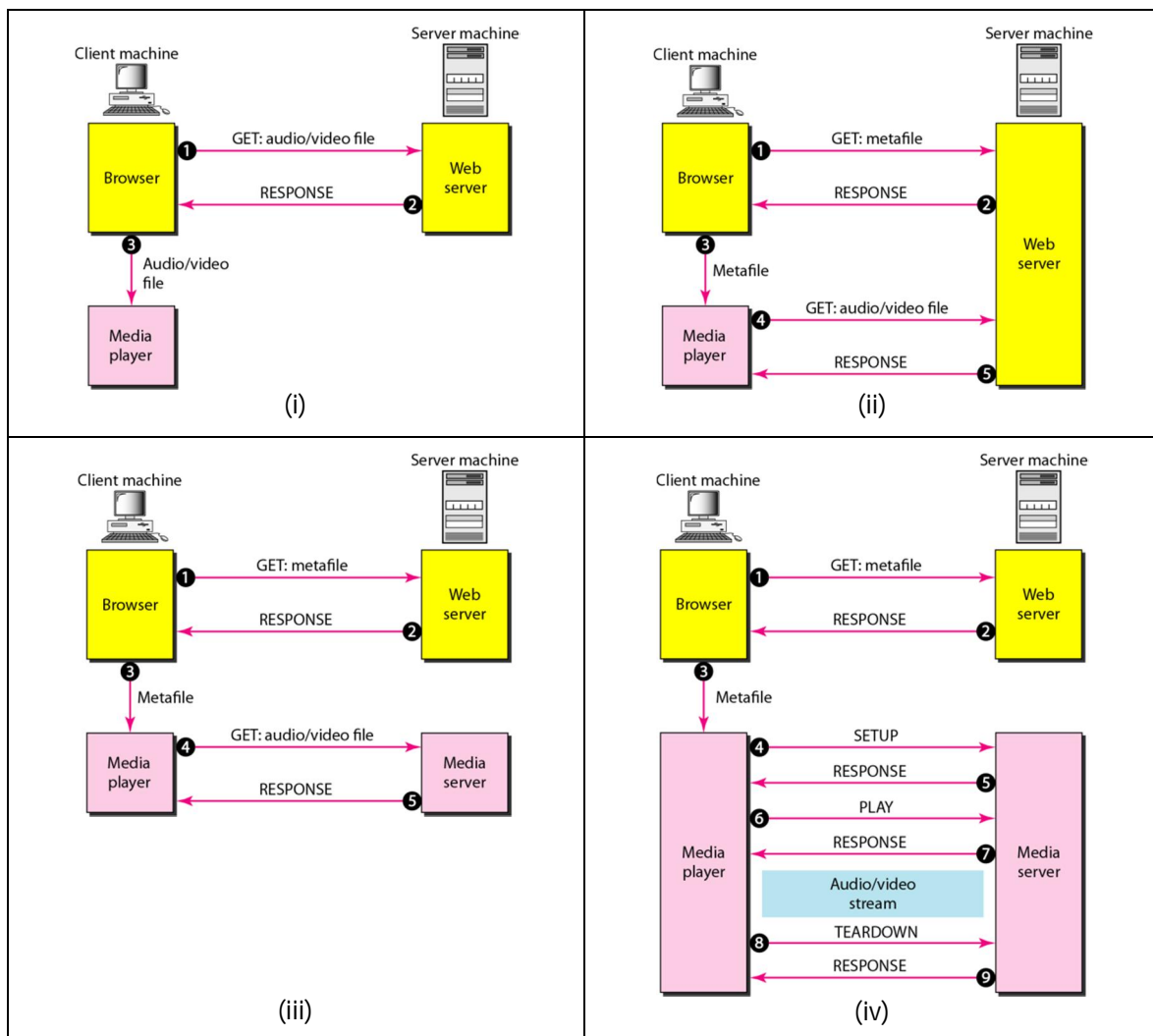
1. Stream Control Transmission Protocol (SCTP)
  - 1.1. [6 points] Explain briefly how and why SCTP is a combination of UDP and TCP. Which features of UDP and TCP reappear in SCTP?
  - 1.2. [6 points] Explain briefly the following SCTP concepts: (i) association; (ii) chunk; (iii) packet; (iv) multistream. Compare them with TCP.
  - 1.3. [6 points] Explain briefly the association establishment process (that is another word for the four-way handshaking mechanism) in SCTP. When are resources allocated? When can the first data chunks be sent? How is this process more secure than TCP's session establishment process?
2. Integrated Services (IntServ), Differentiated Services (DiffServ)
  - 2.1. [3 points] What is the motivation behind IntServ? For which purpose was it designed?
  - 2.2. [6 points] DiffServ was introduced to handle the shortcomings of IntServ. What are the two fundamental changes that were made for this purpose, and what were the problems they solved?
  - 2.3. [4 points] In order to implement DiffServ, a node uses traffic conditioners like meters, markers, shapers, and droppers. Explain briefly what they do. Use the figure below as help.



3. WWW architecture, web documents, HTTP
  - 3.1. [2 points] Describe briefly how the architecture of WWW works. Use the figure below as help.
  - 3.2. [6 points] How and where are dynamic and active HTML documents created, respectively? Discuss briefly the security issues with using dynamic or active documents. Give examples for the technologies involved in dynamic and active documents.
  - 3.3. [3 points] HTTP supports proxy servers. What is their use and how do they work?



4. Electronic mail, File transfer (FTP)
  - 4.1. [2 points] What is the purpose of MIME?
  - 4.2. [4 points] In an FTP session, what is the lifespan of a control connection, i.e. when is it opened and closed? What is the lifespan of a data connection?
  - 4.3. [3 points] What do the FTP commands RETR, STOR, and LIST do?
  - 4.4. [3 points] What are the three pieces of information the client has to define before a file can actually be transferred?
5. Network management
  - 5.1. [4 points] List the essential five functions of a network management system. Pick one of these and define it, stating also its purpose.
6. Streaming stored audio and video
  - 6.1. [6 points] Describe the four approaches to media streaming. Use the figures below as help.



7. Network security
  - 7.1. [6 points] How do we define message (i) confidentiality; (ii) integrity; (iii) authenticity? What methods are used to achieve each of these?
  - 7.2. [2 points] What is Pretty Good Privacy (PGP) designed for? Which layer in the TCP/IP model does it operate on?
  - 7.3. [3 points] What is the purpose of using key rings in PGP? What is contained in the private ring and in the public ring of a user?