

## Question 1 – HTTP (24%)

A client connects to a server using HTTPS and accesses the landing page of a website. The page is supposed to display several images, which the client must download separately.

- a) Present and explain three methods or tools that can be implemented within the browser in order to reduce the number of RTTs required before the page can be fully displayed.
  - b) Give an example of additional methods or tools that can reduce the waiting time but are not implemented on the end host itself.
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## Question 2 – HTTP Versions (28%)

- a) List three features of HTTP/2 that also exist in HTTP/3 but do not exist in HTTP/1 (including features of the lower-layer protocols on which the versions rely).
  - b) List four features of HTTP/3 that do not exist in HTTP/1 or HTTP/2 (including features of the lower-layer protocols on which the versions rely).
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## Question 3 – DNS Records (24%)

A DNS A-type query was sent for the website `www.TauNetworksCourse.com`. The sender received a response that contained the following two records:

```
www.TauNetworksCourse.com: type ____, class IN, CompNets.ABB.com
CompNets.ABB.com:           type ____, class IN, 150.37.1.122
```

The values of the type fields were removed from the records, and no additional information is known about `CompNets.ABB.com`.

- a) Assume the sender is an end host.  
Complete the record type values so that the response is logical, and explain the role of each record type.
  - b) Now assume the sender is not an end host but a DNS resolver.  
Are there additional type values for which the response would still be logical?  
If yes, which ones? If not, explain why.
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## Question 4 – DNS Cache Poisoning (24%)

- a) It is given that a certain DNS resolver measures at all times how many seconds have passed since it was last powered on, and sets the Transaction ID of all outgoing queries to be the lower 16 bits of

this value.

Explain how this design decision makes it easier for an attacker who wishes to poison the resolver's cache, and outline in general terms what such an attacker could do to achieve this goal.

b) Beyond changing the method of selecting the Transaction ID, present two additional actions that can be taken to further harden the resolver against cache poisoning.