Students should be able to...

Everything in previous study guides:
https://www.cs.swarthmore.edu/~rware/cs43/f25/lecs/cs43-quiz-1-study-guide-v2.pdf

Define what a distributed application is and explain the advantages and challenges of distributed systems.

Explain the concept of "partial failure" in a distributed environment and give examples.

Define the three properties of the CAP Theorem and explain the trade-off that a system must "choose two". Why do distributed systems typically have to choose between consistency and availability?

Identify sequences of events that are not casually consistent.

Identify the key services provided by DNS.

Illustrate the hierarchical structure of DNS, defining the specific roles of root server, TLD servers, and authoritative DNS servers.

Explain why DNS is a distributed, hierarchical database. Discuss major problems of a centralized DNS design.

Define the function of a local DNS server and its role in the resolution process.

Compare and contrast iterative and recursive DNS queries and be able to trace the sequence of messages for both query types.

Trace the step-by-step interaction between a web browser and the DNS system that must occur before an HTTP request can be sent.

Define the purpose of the most common DNS Resource Record (RR) types: A / AAAA, NS, CNAME, and MX.

Deconstruct a DNS message, identifying its main sections (header, question, answer, authority, additional).

Discuss why DNS runs on top of UDP instead of TCP.

Explain the role and importance of DNS caching.

Define Time-to-Live (TTL) in the context of a DNS record.

Interpret the output of the dig command, correctly identifying and interpreting the QUESTION, ANSWER, AUTHORITY, and ADDITIONAL sections.

From a dig response with no answer, determine the next server that should be queried in an iterative lookup by using the information in the AUTHORITY and ADDITIONAL sections.

These topics are on the slides but we did not get to them in lecture. Therefore they WILL NOT be covered on this quiz, but will be on a future quiz.

Discuss the trade-offs between setting a short vs. a long TTL value

Outline the three main steps required to register a new domain and make it accessible on the Internet.

Explain how DNS can be used to implement load balancing.

Describe how different types of cyberattacks can target DNS: DDoS attacks against root and TLD servers, man in middle attacks, and DNS positing.

Explain the purpose of DNSSEC.