Units 7, 8, 9
OS and Networks

1. What are the necessary conditions for a deadlock to occur in the OS?

Ans: (1) Competition for non-sharable resources. (Mutual exclusion)
(2) Resources are requested on a partial basis. (Hold and wait)
(3) Once allocated, a resource cannot be forcibly retrieved. (No preemption)
(4) Circular wait (not mentioned in the lecture, and can be omitted)

2. Describe in detail what happens during process switch (context switch)?

Ans: (1) The scheduler invokes an interrupt.
(2) The state (associated memory, registers, etc.) of current process is saved.
(3) The dispatcher restores the state of the selected process.
(4) The selected process resumes the execution.

3. Why is a switch more efficient than a repeater when connecting networks with CSMA/CD protocol?

Ans: A switch divides the network into multiple collision domains, significantly reducing the chance of collisions and resulting in shorter waiting times for CSMA/CD.

4. Describe the 4 layers and their basic functions in the TCP/IP model.

Ans: (1) The application layer constructs messages with address.
(2) The transport layer chops messages into packets.
(3) The network layer handles the routing through the Internet.
(4) The link layer handles the actual transmission of packets.

5. Security sockets layer (SSL) ensures a secure connection between the client and the server by encryption among other techniques. Which layer in the TCP/IP model should SSL operates in? Why?

Ans: SSL operators in the transport layer mainly because the encryption should be done before the message becomes packets. If we encrypt the packets, the Internet would not know how to transmit them. Also, SSL should not operate in the application layer because it needs to remain independent from specific applications, allowing multiple applications utilize the same SSL mechanism.