

Questions:**Question 1 (Computation-based):**

A digital signal has a bit interval of 0.00005 seconds (50 μ s). What is the bit rate (bandwidth) of this signal in Kbps?

Question 2 (Understanding-based):

The slides mention that a "repeater" is a physical layer device. What is the primary function of a repeater, and why is it necessary in digital transmission?

Question 3 (Scenario-based):

You are setting up a network for a large office. You need to ensure that data from different departments can be sent over a single high-capacity link to the internet. Which physical layer concept from the slides would you apply here?

Question 4 (Computation-based):

A sender and receiver are separated by a distance of 2,000 km. The signal propagates through the medium at a speed of 2.0×10^8 m/s. What is the propagation time for a single bit to travel from the sender to the receiver?

Question 5 (Understanding-based):

An analog signal has a frequency of 5 kHz. Explain what its period is and how frequency and period are mathematically related.

Question 6 (Scenario-based):

You are on a phone call and hear a faint conversation in the background from another call. What type of signal impairment is this, and under which broader category of impairment does it fall?

Question 7 (Computation-based):

A network has a bandwidth of 1 Mbps. You need to send a 1-Megabyte (MB) file. Ignoring propagation delay, what is the transmission time?

Question 8 (Understanding-based):

What is the key difference between a simple signal and a composite signal, as described in the slides?

Question 9 (Scenario-based):

You are designing a system to transmit digital data over a long distance. The system experiences significant errors due to electrical equipment nearby. Which type of impairment is the primary source of these errors, and how might you mitigate it? (Refer to the concepts in the slides).

Question 10 (Computation-based):

A communication link has a bandwidth of 5 bps and a delay of 5 seconds.

- a) What is the bandwidth-delay product for this link?
- b) If a sender starts transmitting data and continues for 5 seconds, how many bits will be "in the pipe" (in transit) on the link?