

# CS447 –Networks and Data Communications

## Quiz #5, July 16, 2026 (SOLUTIONS)

Note 1: please provide your solutions to the “solution template”

Note 2: answer the questions by including only the option symbols (i.e., (a), (b), (c), and (d)). Please do NOT answer the questions by copying the actual options for each question.

#1: Which of the following statements is a correct statement about the relation between “detectable errors” and “correctable errors” (select the best option):

- (a) If a packet error is detectable, it is also correctable.
- (b) If a packet error is not detectable, it is not correctable either.
- (c) If a packet error is correctable, it is not detectable.
- (d) If a packet error is not correctable, it is detectable.

Solution: (b)

#2: Which of the following statements about parity-bit error detection is (are) (select all that apply)?

- (a) A single-bit parity error detection can always detect any bit errors.
- (b) A single-bit parity error detection may not always detect any bit errors.
- (c) A single-bit parity error detection can always correct any bit errors after bit errors are detected by a parity bit.
- (d) If more than one parity is applied, it is possible to correct bit errors as long as the bit errors are detected.
- (e) None of the above.

Solution: (b), (d)

**#3:** Which of the following statements is (are) true (select all that apply)?

- (a) A bit error can happen without a framing error.
- (b) A bit error can not happen without a framing error.
- (c) A framing error can happen without a bit error.
- (d) A framing error can not happen without a bit error.
- (e) None of the above.

**Solution:** (a), (d)

**#4:** About the asynchronous transmission using a parity bit, which of the following statements is (are) true (select all that apply)?

- (a) If the number of the payload bits in a frame increase, the probability of a bit error increases
- (b) If the number of the payload bits in a frame increase, the probability of a bit error decreases
- (c) If the transmission rate increases, the probability of a bit error increases
- (d) If the transmission rate increases, the probability of a bit error decreases
- (e) None of the above.

**Solution:** (a), (c)

#5: With regards to the parity-error detection, which of the following statements is correct (select the best one)?

- (a) The even parity and the odd parity are equal in their efficiency for detecting bit errors (the probability in correctly detecting bit errors).
- (b) The even parity is more efficient for detecting bit errors (the probability in correctly detecting bit errors) than odd parity.
- (c) The odd parity is more efficient for detecting bit errors (the probability in correctly detecting bit errors) than even parity.
- (d) None of the above.

**Solution: (a)**

#6: With regards to the advantage of the CRC error detection, which of the following statements is correct (select the best one)?

- (a) CRC error detection can always detect any odd number of bit errors.
- (b) CRC error detection can always detect any even number of bit errors.
- (c) CRC error detection can always detect any bit errors where the number of the bits in errors is same as the number of bits in the FCS bits.
- (d) CRC error detection can always detect any bit errors where the number of the bits in errors is same as the number of bits in the key bits.
- (e) None of the above

**Solution: (e)**

#7: The primary advantage of the parity error detection over CRC error detection is (select the best one):

- (a) The parity error detection is executable by more different types of processors than CRC error detection.
- (b) The parity error detection allows easier debugging than CRC error detection.
- (c) The parity error detection has a better error detection rate than CRC error detection.
- (d) The parity error detection has a lower processor overhead than CRC error detection.

**Solution: (d)**

**#8:** If the number of the stop bit is increased (to more than one bit), which of the following(s) is (are) correct (select all that apply)? Assume that anything else remains unchanged.

- (a) The chances of bit errors will increase
- (b) The chances of bit errors will increase
- (c) The chances of framing errors will increase
- (d) The chances of framing errors will decrease
- (e) None of the above

**Solution: (d)**

**#9:** Synchronous signal transmissions are those transmissions (select the best option: assume that there is no clock drift between a sender and a receiver):

- (a) that do not require a sender and a receiver synchronize (“synchronize” means that a sender and a receiver set their signal sampling timing between them).
- (b) that require a sender and a receiver synchronize once only at the beginning of signal transmissions (“synchronize” means that a sender and a receiver set their signal sampling timing between them).
- (c) that require a sender and a receiver synchronize once only at the end of signal transmissions (“synchronize” means that a sender and a receiver set their signal sampling timing between them).
- (d) that require a sender and a receiver synchronize (“synchronize” means that a sender and a receiver set their signal sampling timing between them) at each signal (each bit) a sender transmits to a receiver.

**Solution: (d)**

**#10:** When the signal transmission rate decreases (select all that apply):

- (a) the chance of bit errors due to the clock-drift between a sender and a receiver increases.
- (b) the chance of the framing errors due to the clock-drift between a sender and a receiver increases.
- (c) the chance of bit errors due to the clock-drift between a sender and a receiver remains the same.
- (d) None of the above.

**Solution: (d)**