--Question Starting--

3. Analyze the following two statements regarding deadlock handling:

Statement I: Deadlock prevention techniques aim to eliminate one or more necessary conditions for deadlock, such as mutual exclusion, hold and wait, no preemption, or circular wait, thereby ensuring deadlock cannot occur.

Statement II: Deadlock detection algorithms periodically check for cycles in resource allocation graphs; upon detection, processes involved in deadlock can be terminated or resource allocations can be rolled back to recover from deadlock.

In the context of these statements, select the most appropriate option:

(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct

Answer Key: 4

Solution:

? Statement I (Incorrect): Deadlock prevention seeks to systematically avoid at least one of the four necessary conditions for deadlock, such as by granting resources in a manner that prevents circular wait or by preempting resources. It does not aim to eliminate all conditions like mutual exclusion or hold and wait directly, but strategically prevents deadlock occurrence.

? Statement II (Correct): Deadlock detection algorithms analyze resource allocation graphs periodically. If a cycle is detected, the system can resolve the deadlock by terminating processes or preempting resources, thereby recovering from deadlock.

Hence, Option (4) is the right answer.

--Question Starting--

4. Consider the following two statements related to data transmission:

Statement I: In digital transmission, bandwidth determines the maximum data rate achievable over a channel, and increasing bandwidth generally increases throughput, provided the signal-to-noise ratio remains constant.

Statement II: Modulation techniques such as QAM (Quadrature Amplitude Modulation) encode multiple bits per symbol, which increases the spectral efficiency but also makes the system more susceptible to noise, potentially increasing error rates.

In view of these statements, identify the correct option:

(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct

Answer Key: 3

Solution:

? Statement I (Correct): Bandwidth limits the maximum data rate (as per Shannon?s theorem). Increasing bandwidth allows higher capacity, assuming noise level stays constant, thus increasing throughput.

? Statement II (Incorrect): While it is true that higher-order modulation schemes like QAM increase spectral efficiency by encoding multiple bits per symbol, they are more sensitive to noise, which can increase error rates. However, the statement suggests a direct susceptibility increase; but the key point is that spectral efficiency is increased at the cost of noise susceptibility, which is a trade-off, not an absolute increase in error rate.

Given the subtlety, the statement overgeneralizes, so it is considered incorrect in the context of the strict analytical approach.

Hence, Option (3) is the right answer.