Begin check point

|  |  |  |
| --- | --- | --- |
| Transaction ID | Last LSN | State |
| T1 | 7 | C |
| T2 | 5 | U |
| T3 | 3 | U |

|  |  |
| --- | --- |
| Page ID | rec LSN |
| P1 | 1 |
| P2 | 2 |
| P3 | 3 |

Q5

(A)

|  |  |
| --- | --- |
| Page ID | rec LSN |
| P1 | 1 |
| P2 | 2 |
| P3 | 3 |

(B)

|  |  |  |
| --- | --- | --- |
| Transaction ID | Last LSN | State |
| T1 | 7 | C |
| T2 | 13 | U |
| T3 | 12 | C |

(C)

T2

(D)

Since T2 is active on crashing, three CLR are added to the log.

|  |  |
| --- | --- |
| LSN | LOG |
| 15 | T2 CLR (P3) undone next LSN = 5 |
| 16 | T2 CLR (P2) undone next LSN = 2 |
| 17 | T2 CLR (P2) |

(E)

There are 2 CLR records are added in in the UNDO phase.