

**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT**

**TEST -3 EXAMINATION- 2025**

**B.Tech-III Semester (CSE/IT)**

**COURSE CODE (CREDITS): 25B11CI313 (3)**

**MAX. MARKS: 35**

**COURSE NAME: DATABASE MANAGEMENT SYTEMS**

**MAX. TIME: 2 Hours**

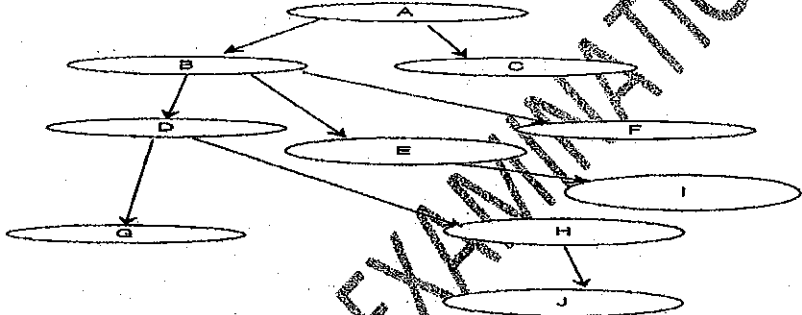
**COURSE INSTRUCTORS: {Pardeep, Ekta, Amol, Pankaj, Nitika, Gaurav}**

**Note: (a) All questions are compulsory.**

**(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems**

**(c) Give step by step answer of each questions**

| (c) Give step by step answer of each questions |   |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
|--|---|----|-------|-----------|-----------|-----------|------|------------|-----------|------------|------------|--|------------|---|---|
| Q.No   | Question  | CO | Marks |           |           |           |      |            |           |            |            |  |            |   |   |
| Q1   | <p>Consider that Database Administrator (DBA) would like to implement the following security policy as per MAC (Mandatory Access Control Protocol) in the database of an organization: Users (U1, U2 and U3) can access the files (F1, F2 and F3). The clearance level of users is: U1 (2-Confidential), U2 (4- Top Secret) and U3 (1- Public). The files are classified as F1 (1-Public), F2 (2- Confidential) and F3(4-Top Secret).</p> <p>Answer whether the access to the following attempts will be granted or denied</p> <p>(a) U1 would like to access F3<br/>(b) U2 would like to access F1<br/>(c) U3 would like to access F2<br/>(d) U3 would like to access F3<br/>(e) U2 would like to access F3<br/>(f) U3 would like to access F1</p> | 6  | 6     |           |           |           |      |            |           |            |            |  |            |   |   |
| Q2   | <p>Consider the schedule S of transactions T1 and T2:</p> <table><tr><td>T1</td><td>T2</td></tr><tr><td>R(a)</td><td>W(a)</td></tr><tr><td>W(a)</td><td>W(a)</td></tr></table> <p>Apply conflict serializable method to find out serializable schedule. If conflict serializable schedule doesn't exist then find out serializable schedule corresponding to S using view serializable method.</p>  | T1 | T2    | R(a)      | W(a)      | W(a)      | W(a) | 5          | 5         |            |            |  |            |   |   |
| T1   | T2  |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| R(a)   | W(a)  |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| W(a)   | W(a)  |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| Q3   | <p>Consider the schedule S of transactions T1 and T2:</p> <table><tr><td>T1</td><td>T2</td></tr><tr><td>Lock S(A)</td><td>Lock X(A)</td></tr><tr><td>Lock X(B)</td><td></td></tr><tr><td>Unlock (A)</td><td>Lock X(D)</td></tr><tr><td>Unlock (B)</td><td>Unlock (A)</td></tr><tr><td></td><td>Unlock (D)</td></tr></table> <p>Apply the two phase locking protocol (2 PL) and show the resultant schedule S<sub>1</sub>. Also find the serial schedule corresponding to S<sub>1</sub>.</p>   | T1 | T2    | Lock S(A) | Lock X(A) | Lock X(B) |      | Unlock (A) | Lock X(D) | Unlock (B) | Unlock (A) |  | Unlock (D) | 5 | 5 |
| T1   | T2  |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| Lock S(A)                                      | Lock X(A)   |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| Lock X(B)                                      |   |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| Unlock (A)                                     | Lock X(D)   |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
| Unlock (B)                                     | Unlock (A)  |    |       |           |           |           |      |            |           |            |            |  |            |   |   |
|  | Unlock (D)  |    |       |           |           |           |      |            |           |            |            |  |            |   |   |

|              |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|--------------|---|--------------|--------------|--------------|------|-----------|-----------|----|------|-----------|-----------|---|-----------|----|-----------|-----------|------|---|------------|----|------|-----------|----|------|-----------|-----------|---|--|--|------------|--|--|--|------------|--|--|--|--|------------|--|--|-----------|--|--|--|------------|--|--|--|--|--|-----------|--|--|--|-----------|--|--|--|--|-----------|--|--|--|-----------|--|--|--|------------|--|--|--|------------|--|--|------------|--|--|--|------------|--|------------|--|--|--|---|---|
| Q4           | <p>Consider the set of transactions in Schedule S as per the details below:</p> <table><tr><td>T1</td><td>T2</td><td>T3</td><td>T4</td></tr><tr><td>Lock X(B)</td><td></td><td></td><td></td></tr><tr><td></td><td>Lock X(D)</td><td></td><td></td></tr><tr><td></td><td>Lock X(H)</td><td></td><td></td></tr><tr><td></td><td>Unlock (D)</td><td></td><td></td></tr><tr><td>Lock X(E)</td><td></td><td></td><td></td></tr><tr><td>Lock X(D)</td><td></td><td></td><td></td></tr><tr><td>Unlock (B)</td><td></td><td></td><td></td></tr><tr><td>Unlock (E)</td><td></td><td></td><td></td></tr><tr><td></td><td>Unlock (H)</td><td></td><td></td></tr><tr><td>Lock X(G)</td><td></td><td></td><td></td></tr><tr><td>Unlock (D)</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>Lock X(B)</td><td></td></tr><tr><td></td><td></td><td>Lock X(E)</td><td></td></tr><tr><td></td><td></td><td></td><td>Lock X(D)</td></tr><tr><td></td><td></td><td></td><td>Lock X(H)</td></tr><tr><td></td><td></td><td></td><td>Unlock (D)</td></tr><tr><td></td><td></td><td></td><td>Unlock (H)</td></tr><tr><td></td><td></td><td>Unlock (E)</td><td></td></tr><tr><td></td><td></td><td>Unlock (B)</td><td></td></tr><tr><td>Unlock (G)</td><td></td><td></td><td></td></tr></table> <p>The database graph for the execution of S is given as under:</p>  <p>Apply graph based locking protocol for the execution of S on the above database graph and report problem if any.</p> | T1           | T2           | T3           | T4   | Lock X(B) |           |    |      |           | Lock X(D) |   |           |    | Lock X(H) |           |      |   | Unlock (D) |    |      | Lock X(E) |    |      |           | Lock X(D) |   |  |  | Unlock (B) |  |  |  | Unlock (E) |  |  |  |  | Unlock (H) |  |  | Lock X(G) |  |  |  | Unlock (D) |  |  |  |  |  | Lock X(B) |  |  |  | Lock X(E) |  |  |  |  | Lock X(D) |  |  |  | Lock X(H) |  |  |  | Unlock (D) |  |  |  | Unlock (H) |  |  | Unlock (E) |  |  |  | Unlock (B) |  | Unlock (G) |  |  |  | 5 | 7 |
| T1           | T2  | T3           | T4           |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Lock X(B)    |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              | Lock X(D)   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              | Lock X(H)   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              | Unlock (D)  |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Lock X(E)    |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Lock X(D)    |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Unlock (B)   |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Unlock (E)   |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              | Unlock (H)  |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Lock X(G)    |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Unlock (D)   |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   | Lock X(B)    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   | Lock X(E)    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   |              | Lock X(D)    |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   |              | Lock X(H)    |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   |              | Unlock (D)   |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   |              | Unlock (H)   |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   | Unlock (E)   |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   | Unlock (B)   |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Unlock (G)   |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Q5           | <p>Consider the schedule of transactions S given as under:</p> <table><tr><td>T1 (TS: 400)</td><td>T2 (TS: 500)</td><td>T3 (TS: 600)</td></tr><tr><td>R(A)</td><td></td><td></td></tr><tr><td></td><td>R(B)</td><td></td></tr><tr><td>W(C)</td><td></td><td></td></tr><tr><td></td><td></td><td>R(B)</td></tr><tr><td>R(C)</td><td></td><td></td></tr><tr><td></td><td>W(B)</td><td></td></tr><tr><td></td><td></td><td>W(A)</td></tr></table> <p>Apply basic time stamp ordering protocol on S and show the transactions execution.</p>  | T1 (TS: 400) | T2 (TS: 500) | T3 (TS: 600) | R(A) |           |           |    | R(B) |           | W(C)      |   |           |    |           | R(B)      | R(C) |   |            |    | W(B) |           |    |      | W(A)      | 5         | 7 |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T1 (TS: 400) | T2 (TS: 500)  | T3 (TS: 600) |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| R(A)         |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              | R(B)  |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| W(C)         |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   | R(B)         |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| R(C)         |   |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              | W(B)  |              |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
|              |   | W(A)         |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Q6           | <p>Consider the set of transactions along with data items given as under:</p> <table><tr><td>Transactions</td><td>Data Items</td><td>Locks</td></tr><tr><td>T1</td><td>Q</td><td>Exclusive</td></tr><tr><td>T2</td><td>P, Q</td><td>Exclusive</td></tr><tr><td>T3</td><td>Q</td><td>Exclusive</td></tr><tr><td>T4</td><td>P</td><td>Exclusive</td></tr><tr><td>T5</td><td>R</td><td>Exclusive</td></tr><tr><td>T6</td><td>R, Q</td><td>Exclusive</td></tr><tr><td>T7</td><td>P, R</td><td>Exclusive</td></tr></table> <p>Draw the wait-for graph for the above set of transactions. Is there a deadlock?</p>  | Transactions | Data Items   | Locks        | T1   | Q         | Exclusive | T2 | P, Q | Exclusive | T3        | Q | Exclusive | T4 | P         | Exclusive | T5   | R | Exclusive  | T6 | R, Q | Exclusive | T7 | P, R | Exclusive | 5         | 5 |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| Transactions | Data Items  | Locks        |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T1           | Q   | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T2           | P, Q  | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T3           | Q   | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T4           | P   | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T5           | R   | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T6           | R, Q  | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |
| T7           | P, R  | Exclusive    |              |              |      |           |           |    |      |           |           |   |           |    |           |           |      |   |            |    |      |           |    |      |           |           |   |  |  |            |  |  |  |            |  |  |  |  |            |  |  |           |  |  |  |            |  |  |  |  |  |           |  |  |  |           |  |  |  |  |           |  |  |  |           |  |  |  |            |  |  |  |            |  |  |            |  |  |  |            |  |            |  |  |  |   |   |