2 (a)

**Pr(Trav)**

|  |  |
| --- | --- |
| **Trav** |  |
| True | 0.05 |
| False | 0.95 |

**Pr(FP | Fraud, Trav)**

|  |  |  |  |
| --- | --- | --- | --- |
| **FP** | **Fraud** | **Trav** |  |
| True | True | True | 0.9 |
| True | True | False | 0.1 |
| True | False | True | 0.9 |
| True | False | False | 0.01 |
| False | True | True | 0.1 |
| False | True | False | 0.9 |
| False | False | True | 0.1 |
| False | False | False | 0.99 |

**Pr(OC)**

|  |  |
| --- | --- |
| **OC** |  |
| True | 0.8 |
| False | 0.2 |

**Pr(CRP | OC)**

|  |  |  |
| --- | --- | --- |
| **CRP** | **OC** |  |
| True | True | 0.1 |
| True | False | 0.01 |
| False | True | 0.9 |
| False | False | 0.99 |

**Pr(IP | Fraud, OC)**

|  |  |  |  |
| --- | --- | --- | --- |
| **IP** | **Fraud** | **OC** |  |
| True | True | True | 0.15 |
| True | True | False | 0.051 |
| True | False | True | 0.1 |
| True | False | False | 0.001 |
| False | True | True | 0.85 |
| False | True | False | 0.949 |
| False | False | True | 0.9 |
| False | False | False | 0.999 |

**Pr(Fraud | Trav)**

|  |  |  |
| --- | --- | --- |
| **Fraud** | **Trav** |  |
| True | True | 0.01 |
| True | False | 0.004 |
| False | True | 0.99 |
| False | False | 0.996 |

(b) (1)

Elimination procedure:

|  |  |  |
| --- | --- | --- |
| **Fraud** | **Trav** |  |
| True | True | 0.0005 |
| True | False | 0.0038 |
| False | True | 0.0495 |
| False | False | 0.9462 |

Eliminate **Trav**

|  |  |
| --- | --- |
| **Fraud** |  |
| True | 0.0043 |
| False | 0.9957 |

(b) (2)

3 (a)

1. No, D and G are dependent. There is a path from D to G which is not blocked since there is no evidence in that path. So, D and G are dependent.
2. No, D and G are dependent. There is an evidence F in one path from D to G, but there is another path from D to G that is not blocked. So, D and G are dependent.
3. No, A and G are dependent. The indirect path from G to D goes into C, and the indirect path from A to B goes out C. C is not in the evidence set, so this path between A and G is not blocked. So, A and G are dependent.
4. No, A and G are dependent. The indirect path from G to D goes into C, and the indirect path from A to B goes out C. C is not in the evidence set, so this path between A and G is not blocked. So, A and G are dependent.
5. No, A and G are dependent. The indirect path from G to F and the indirect path from A to C both leave D. D is not in the evidence set, so this path between A and G is not blocked. So, A and G are dependent.
6. No, A and G are dependent. The indirect path from G to E and the indirect path from A to B both leave C. C is not in the evidence set, so this path between A and G is not blocked. So, A and G are dependent.
7. No, A and G are dependent. The indirect path from G to F and the indirect path from A to C both enter E. E is in the evidence set, so this path between A and G is not blocked. So, A and G are dependent.

3 (b)

1. C is relevant since C is the query variable.
2. D is relevant since D is the parent of C, and C is relevant.
3. E is relevant since E is in evidence set, and E is the descendent of a relevant node C.
4. F is relevant since F is the parent of E, and F is relevant.

Above all, the subset of relevant variables that is sufficient to answer this query is {C, D, E, F}.