1. A) Each value now is atomic --- 1NF

FD1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| horseId | horseName | dob | sire | dam |
|  |  |  |  |  |

FD2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| horseId | horseName | dob | sire | dam |
| H1 | Hn2 | D2 | S1 |  |

FD3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| horseId | horseName | dob | sire | dam |
| H3 | Hn3 | D3 |  | Dm3 |

As Sire and Damn are primary key’s (horse id’s) they need to have decomposed.

FD4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| raceId | raceName | winPurse | placePurse | showPurse |
| Rc1 | rcN1 | Wp1 | Pp1 | Sp1 |

FD5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| horseId | raceId | postPosition | finalStanding | dollars |
| H1 | R1 | Post1 | Final1 | 1 |

B) As horseid and raceID are both primary key’s No non-prime attribute may depend on any subset of the PK --- 2NF, rest remains the same.

FD6

|  |  |  |
| --- | --- | --- |
| horseId | postPosition | dollars |
| H1 | Post1 | 1 |

FD7

|  |  |
| --- | --- |
| raceId | finalStanding |
| R1 | Final1 |

c) Already in 3NF

1. A) All values already atomic, no new tables necessary --- 1NF

LB1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| libraryId | name | street | city | state | zip | phone |
| Lb1 | Name1 | Street1 | Dekalb | IL | 60115 | 8157878888 |

LB2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| bookIsbn | title | publisher | pubDate | pages |
| 12345678910 | stillyBook | SillyPub | Jan12018 | 545 |

LB3

|  |  |  |
| --- | --- | --- |
| authorId | fname | lname |
| 121 | Abc | Efg |

LB4

|  |  |  |  |
| --- | --- | --- | --- |
| libraryId | bookIsbn | totalCopies | numOnShelf |
| Lb1 | 12345678910 | 2 | 1 |

B) fix the partial key dependency --- 2NF

LB5

|  |  |
| --- | --- |
| libraryId | numOnShelf |
| Lb1 | 1 |

LB6

|  |  |
| --- | --- |
| bookIsbn | totalCopies |
| 12345678910 | 2 |

C) Already in 3NF

3) A) Each value now is atomic --- 1NF

DD1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| id | commonName | scientificName | contagiousPeriod | lethality |
| 121212 | Asprin | scientificNameForIt | 11M | 0.01 |

DD2

|  |  |
| --- | --- |
| symptom | description |
| S1 | Desc1 |

DD3

|  |  |  |
| --- | --- | --- |
| drug | drugName | generic |
| Dd1 | dName | Crp1 |

DD4

|  |  |
| --- | --- |
| sideEffect | sDescription |
| Se1 | sDesc1 |

DD5

|  |  |  |
| --- | --- | --- |
| drug | sideEffect | severity |
| Dd2 | Se2 | Ss1 |

B) Fix partial key dependency --- 2NF

DD6

|  |  |
| --- | --- |
| drug | sideEffect |
| Dd3 | Se3 |

C No non-prime attribute may be functionally determined by another non-prime attribute --- 3NF

|  |  |
| --- | --- |
| sideEffect | severity |
| Se3 | Ss1 |