Customers Table:

FD = { CustomerID → Fullname, Email, Passwordhash, PhoneNumber, CustomerAddress, CreationDate

Email → CustomerID, Fullname, Passwordhash, Phonenumber, CustomerAddress, Creationdate }

Candidate Keys come out to be CustomerId and Email.

Hence, this table is in BCNF. (L·H·S· must be a SK).

Products Table:

FD = { ProductID → Productname, Productdescription, Category, Price, Stock, ImageURL, Addedat

Productdescription → ProductID, Productname, Category, Price, Stock, ImageURL, Addedat }

Candidate Keys come out to be ProductID and ProductDescription.

Thus, table is in BCNF. (L·H·S· are SKs).

Orders Table:

FD = { OrderID → CustomerID, Orderdate, TotalAmount, Orderstatus }

The only candidate key is OrderID.

Table is in BCNF.

Orderdetails Table:

FD = { OrderDetailID → OrderID, ProductID, Quantity, Price

(OrderID, ProductID) → Quantity, Price, OrderDetailsID

OrderDetailID is a valid CK.

As the pair of OrderID with ProductID is always unique (as Quantity is there, so these values will never repeat), this pair also becomes a valid CK.

Hence, table is in BCNF.

Admins Table:

FD = { AdminID → Username, Passwordhash

Username → AdminID, Passwordhash }

AdminID and Username are both CKs.

Hence, table is in BCNF.

Stocks Table:

FD = { ID → ProductID, AdminID, Quantity

(ProductID, AdminID) → Quantity, ID }

ID is a CK.

(ProductID, AdminID) is a valid CK because this pair will be unique as Quantity is added to the table. Hence, can define all the attributes.

Thus, table is in BCNF

Payments Table:

FD= { PaymentID → OrderID, PaymentMethod, PaymentStatus, TransactionDate

OrderID → PaymentID, PaymentMethod, PaymentStatus, TransactionDate }

PaymentID is a valid CK.

OrderID is not a valid CK because it is not unique.

The table is in 3NF as R.H.S. has prime attribute (PaymentID).

Need to convert it from 3NF to BCNF.

R1 (OrderID, PaymentID)

FD= { PaymentID → OrderID }

PaymentID is CK.

Table is in BCNF.

We should call R1 (Payments).

R2 (OrderID, PaymentMethod, PaymentStatus, TransactionDate)

FD= { OrderID → paymentMethod, PaymentStatus, TransactionDate }

The OrderID is CK.

Table is in BCNF.

We should call R2 (PaymentInfo).

Returns Table:

FD= { ReturnID → OrderDetailsID, Reason, ReturnStatus, RequestDate

OrderDetailID → ReturnID, Reason, ReturnStatus, RequestDate }

ReturnID is a CK.

OrderDetailID is not a CK as it is not unique.

The table is in 3NF as R.H.S. has prime attribute (ReturnID).

we need to decompose table into further tables.

R1 (OrderDetailID, Reason, ReturnStatus, RequestDate)

FD = { OrderDetailID → Reason ReturnStatus RequestDate }

CK is OrderDetailID.

It is in BCNF.

Name R1 as ReturnInfo.

R2 (ReturnID, OrderDetailID)

FD = { ReturnID → OrderDetailID }

CK is returnID.

It is in BCNF.

Name R2 as Returns.