

**CST 8215**

**Section 351**

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## 1. Abstract (5 Marks)

The XYZ Manufacturing company is upgrading its fully automated but outdated application system, which currently uses index files and lacks decision support capabilities. The goal is to transition to a modern database system to enable ad hoc and “what if” queries. Initially, the focus is solely on replacing the existing system without adding new ad hoc screens or reports. Key considerations include managing customer data, order processing, product details, and inventory management, ensuring data integrity, security, and performance throughout the transition.

## 2. Entities (10 Marks)

**Customer:** this entity is used to keep track of the customers

**Customer record:** this entity is used to keep track of each customer’s discount amounts.

**Shipping:** this entity is used to keep track of shipments for each order

**Orders:** this entity is used to keep track of orders

**Line item:** this entity is used to keep track of the products requested by each order, as well as their quantity (those that can be delivered based on the quantity in stock and those that are backordered)

**Product:** this entity is used to keep track of the products sold by the company

**Part:** this entity is used to keep track of the parts needed by the different products sold by the company

**Customer:** {Customer\_id} -> Customer Name, Customer Phone Number, Credit Limit, Shipping Address

**Customer Record:** {Record\_id, Customer\_id, Order\_id } -> Discount, Discount\_AMT , Order\_Count,

**Shipping:** {Shipping\_id, Customer\_id, Order\_id} -> Status, Mailing\_Address

**Orders:** {Order\_id, Customer\_id, Customer\_id } -> Order\_date, Total, Amount\_owing , Order\_status

**Line item:** {Item Number, Order\_id, Product\_code } -> Filled, Quantity, Amount, Back\_ordered

**Product:** {Product\_code} -> Product\_price, Description

**Part:** {Part Number} -> Part\_description

**Inventory:** {Inventory\_date, Part\_number, Product\_code } -> Part\_quantity\_available, Product\_quantity\_available

### 3. Business Rules (10 Marks)

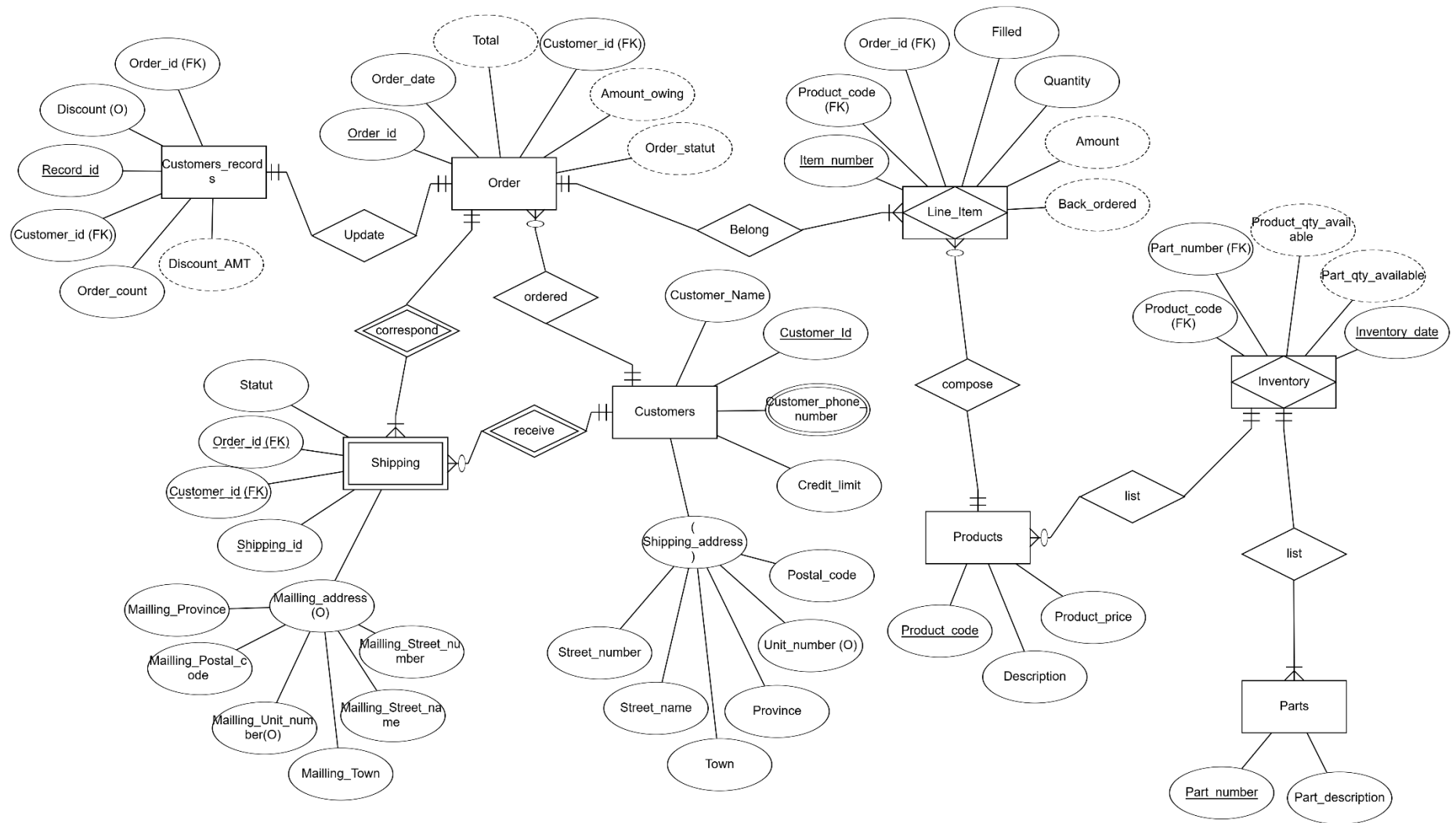
- A customer places zero or more orders, an order is placed by a single customer.
- A customer receives zero or more shipping, and a shipping is received by only one customer
- A shipping corresponds to a single order, and an order corresponds to one or more shipping
- An order updates one customer record, and a customer record is updated by one order
- A line item belongs to a single order, and an order has one or more line items
- A line item is composed of a single product, and a product is composed of zero or more line items
- An inventory lists zero or more products, and a product is listed once by an inventory.
- An inventory lists zero or more parts, and a part is listed once by an inventory.

A customer becomes a preferred customer and receives a discount after placing 10 orders; Then, their order count resets to zero, and the cycle begins again.

The status indicates whether a delivery is completed, and the order status shows if all deliveries have been made and the order can be closed.

Mailing address is optional, and if not provided, shipping address is used as default mailing address

#### 4. Conceptual Model (20 Marks)



## 5. Physical diagram (45 Mark):

