**4.Explain the differences between Message Passing GNN, graph convolution network (GCN), graph attention network (GAT) and GraphSAGE.**

**Differences between Message Passing GNN, GCN, GAT, and GraphSAGE**

Message Passing GNN is a general framework where each node updates its representation by collecting (or "passing") messages from its neighbors. It's like a base model for many GNN variants.  
Graph Convolutional Network (GCN) applies a type of convolution operation to graphs. It takes the average of neighboring node features and then applies a transformation. It’s simple but powerful for many graph tasks.  
Graph Attention Network (GAT) improves on GCN by adding an attention mechanism. This means it learns to give more importance to some neighbors over others when aggregating features.  
GraphSAGE (Graph Sample and Aggregation) is different because it samples a fixed number of neighbors instead of using all of them, which makes it more scalable. It also supports different aggregation functions like mean, LSTM, or max-pooling.