Question 4:

# Part A:

Nodes are the end systems in a network. They come in many forms such as Computers, Cell Phones, Servers etc. In order to share data, they require interconnectivity with each other which is achieved using links such as cables, Wifi, Ethernet etc.

# Part B:

The following are the different types of Network Topologies:

1. Bus Topology: It consists of all nodes being connected at different parts of a single link. This results in easy and efficient installation but causes traffic congestion problems.
2. Ring Topology: It consists of all nodes connected in the shape of ring to each other. This results in decrease in cable usage but lack of scalability and flexibility(one node failure can cause complete network failure).
3. Star Topology: It consists of all nodes being connected to a single point(modem). This increases privacy and scalability, but introduces a single point of failure in the form of modem.
4. Mesh Topology: It consists of all nodes being interconnected with every other node. Due to this, the network is secure, fast and robust. However, this causes a huge cable overhead and expensive addition of new nodes.
5. Tree Topology: It consists of a parent node that is hierarchically connected to children nodes. It is easily scalable , but parent node failure can cripple the entire network.

# Part C:

Search engines consist of three distinct parts. First is the crawler which routinely searches the whole internet and stores whatever URLs it finds in a database. This database is the second part which is called an index. The third part is a search algorithm which takes user inputted keywords and searches through the index looking matches. Any matching URLs are returned to user.

Browsers: Mozilla Firefox, Google Chrome, Opera, Safari, etc

# Part D:

Protocols are the set of rules and instructions which a computer uses to communicate with other computers over a network. It consists of header and body, which contain the operating detail of the given protocol.

Examples: TCP/IP, UDP, IMAP, POP3, SMTP, etc