# Module (1) Introduction to Internet of Things

## 2 Marks

(1) Define Networking

Ans Networking refers to the linking of computers & communication devices which interconnect through a network & are separated by unique device identifiers

(2) What are the various parameters according to which computer n/ws are classified?

Ans Computer n/ws are classified according to various parameters ⇒ (1) Type of connection
(2) Physical Topology
(3) Reach of the network

(3) List the layers present in Internet protocol suite

Ans The 4 layers of Internet protocol suite are
(1) Link layer
(2) Internet layer
(3) Transport layer
(4) Application layer

(4) What are the most commonly used traditional layered network modules?

Ans The most commonly used traditional layered network modules are:-
(1) Open S/ms Interconnection (ISO-OSI)
(2) Internet protocol suite

(5) Define IoT

Ans IoT (Internet of things) refers to network of physical objects i.e, things that are embeded with sensors, software & other technologies for the purpose of connecting & exchanging data with other devices & systems over the internet

(6) What are the different types of physical topologies?

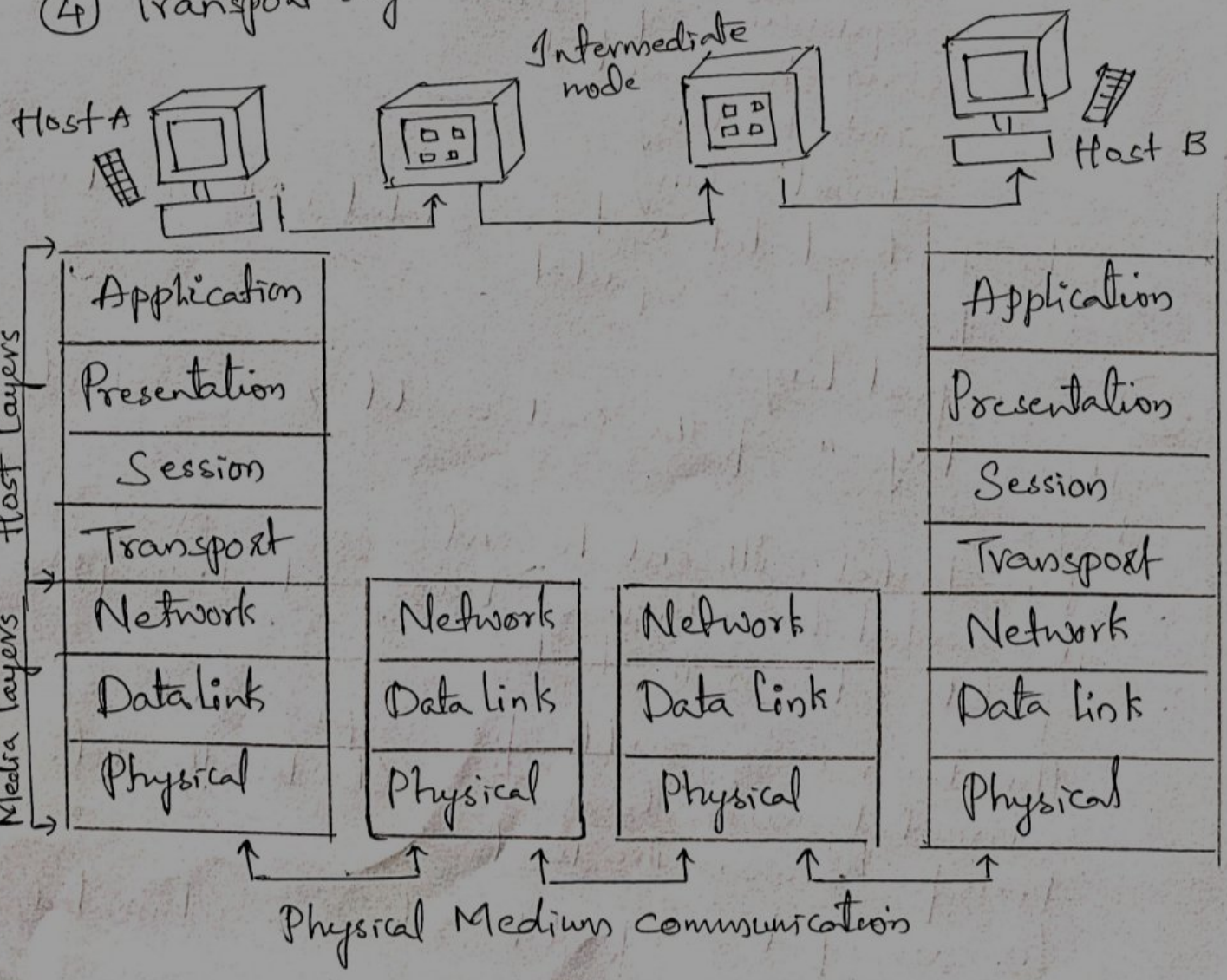
(2) (a) List the layers of OSI Model (2m)

(b) Draw the figure to show the networked communication betn the two hosts following the OSI Model. (3m)

Ans (a) The layers of the OSI Model are

1. Physical Layer
2. Data Link Layer
3. Network Layer
4. Transport layer
5. Session Layer
6. Presentation Layer
7. Application Layer

(b)



(3) Explain the following characteristics of IoT
(a) Dynamic & self Adapting
(b) Self - configuring

Ans (a) Dynamic & self Adapting

IoT devices and systems have the capability to dynamically adapt with the changing contexts and take actions based on their
- operating conditions
- user's context
- Sensed environment

Ex:- Surveillance s/m, comprising several serveillence cameras, serveillence camera can adapt their modes based on whether it is day or night modes
- cameras can switch their modes from lower resolution to higher resolution when any motion is detected & alert nearby cameras to do the same

(b) Self configuring

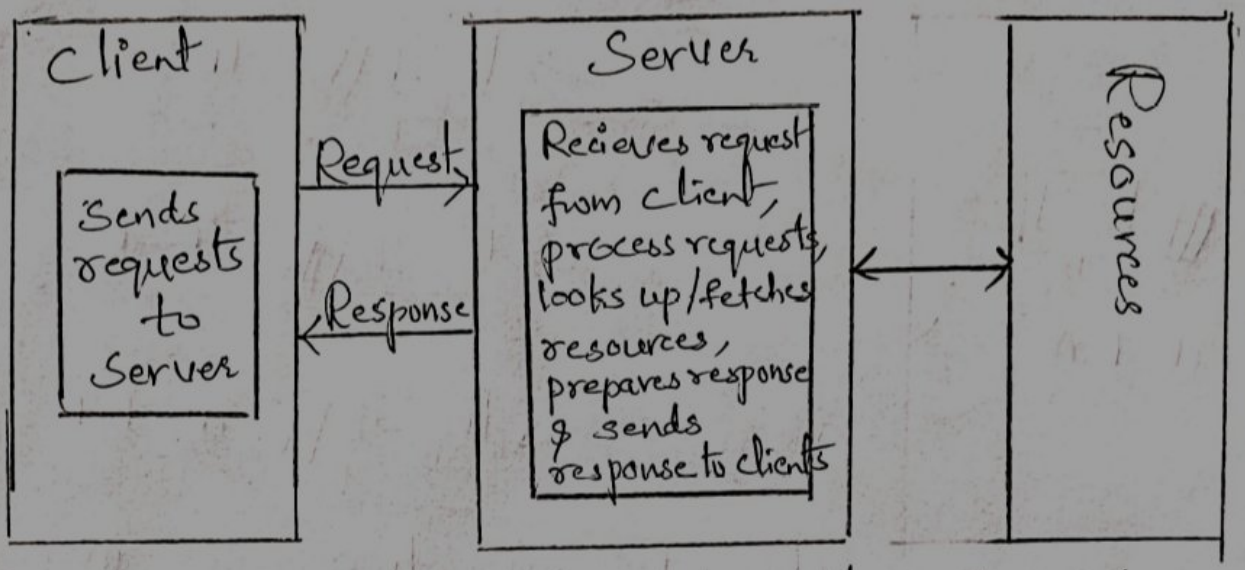
IoT devices may have self-configuring capability allowing a large no number of devices to work together to provide certain functionality

Ex:- Weather monitoring

These devices have the ability to
- configure themselves
- Setup networking
- fetch latest software upgrades with minimal manual or user interconnection

(7) Describe the working of Request-Response IoT communication Model

Ans




Request response is a communication model in which the client sends requests to the server & the server responds to the requests.

When the server recieves the requests,
- it decides how to respond.
- fetches the data
- retrieves resource representations
- prepares the response
- then sends the response to the client

It is a 'stateless' communication Model & each pair of request-response pair is independent of others.

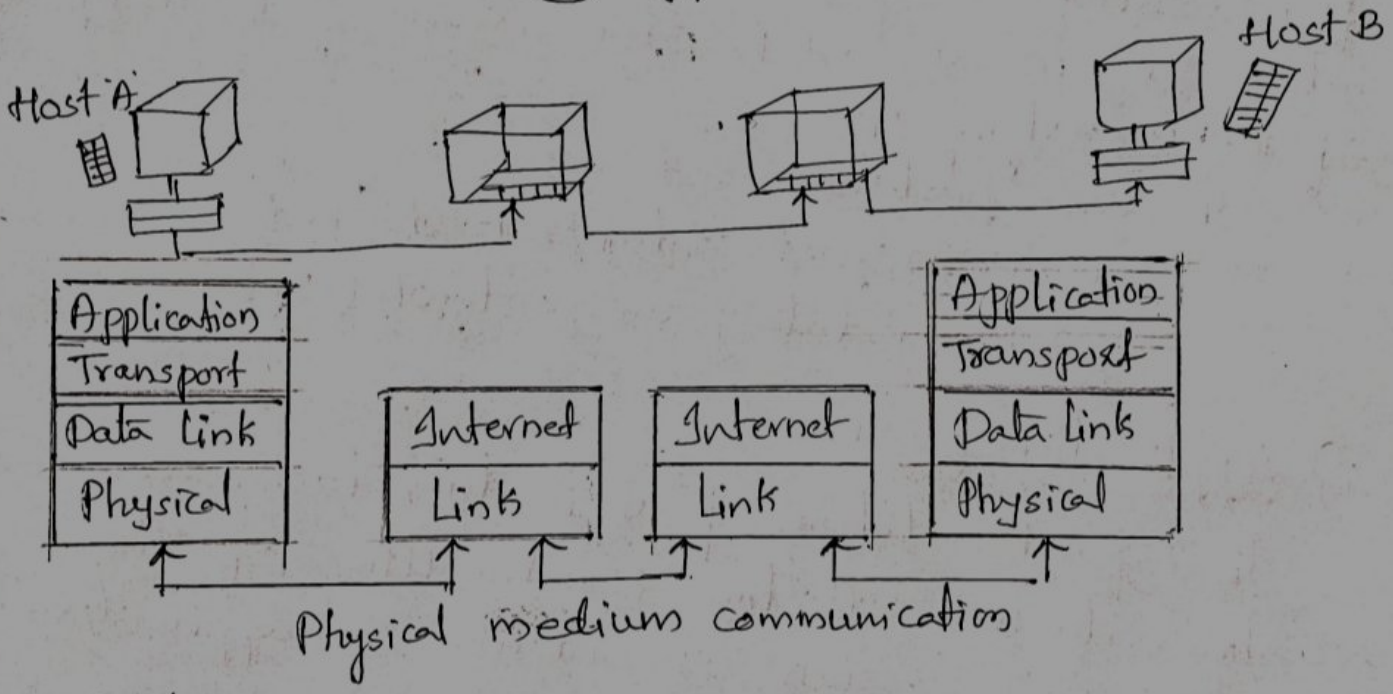
10 marks

Q. Explain the Internet Protocol suite in detail & illustrate its layered architecture with a neat diagram

Ans Internet protocol suite is the conceptual framework that provides levels of abstraction for ease of understanding & development of communication

It is also called as TCP/IP suite.

It has 4 layers → ① Link layer
② Internet layer
③ Transport layer
④ Application layer




① Link Layer

- The first & base layer of the TCP/IP protocol suite is also known as the N/w Interface layer
- It is similar to physical & data link layer of OSI model
- It enables Transmission of TCP/IP packets over the physical medium

② Internet layer

It is similar to network layer of OSI model & is responsible for addressing, address translation, data packaging, data disassembly & assembly, routing and packet delivery, tracking operations, ARP, IP, ICMP, IGMP

③ Transport layer

It is similar to the transport layer of OSI model It is tasked with the functions of error control, flow control, congestion control, segmentation & addressing in an end-to-end manner & is independent of the underlying nfw.

The core protocols used are

① Transport control protocol (TCP)

② User datagram protocol (UDP)

④ Application layer

The functionalities of application layer are similar with the collective functionalities of the OSI Model's session, presentation & application layer.

This layer enables an end-user to access the services of the underlying layers & defines the protocols for the transfer of data

(2) List and explain the components of IoT networking?

Ans The components of IoT networking are

1. IoT node
2. IoT router
3. IoT LAN
4. IoT WAN
5. IoT gateway
6. IoT proxy

IoT Node:-

- These are the networking devices within an IoT LAN.
- Each of these devices is typically made up of a sensor, a processor and a radio which communicates within the network infrastructure
- Nodes may be connected to other nodes inside a LAN directly or by means of a common gateway for that LAN
- connections outside the LAN are through gateways and proxies

(ii) IoT Router

- An IoT Router is a piece of networking equipment that is primarily tasked with the routing of packets both the various entities in the IoT network.
- It keeps the traffic flowing correctly within the network
- A router can be repurposed as a gateway by enhancing its functionalities

(iii) IoT LAN

- Local Area Network (LAN) enables local connectivity within the purview of a single gateway
- They consists of short-range connectivity technologies
- IoT LANs may or may not be connected to the Internet
- They are localized within a building or an organization

(iv) IoT WAN

- Wide Area Network (WAN) connects various network segments such as LANs
- They are typically organizationally & geographically wide with their operational range lying between a few kilometers to hundreds of kilometers

(v) IoT Gateway

- An IoT Gateway is simply a router connecting the IoT LAN to a WAN or the internet
- Gateways can implement several LANs & WANs

Their primary task is to forward packets between the LANs & WANs & the IP layer using only layer 3

(vi) IoT Proxy

- Proxies actively Lie on the application layer & performs application layer functions between the IoT nodes & other entities.
- Application Layer proxies are a means of providing security to the network entities under it, it helps to extend the addressing range of the network

2 marks

(Q) What is M2M?

Ans M2M (Machine to Machine) is a system of connected Machines & devices, which can talk amongst themselves without any human intervention.

2m

(Q) Define Cyber physical s/m

Ans Cyber physical system is a closed control loop system for sensing, processing & actuation using a feedback Mechanism.