**Note: Mathematical model is compulsory.**

**A1: HTTP header analysis:**

1. What is Hypertext Transfer Protocol (HTTP)?
2. Port number for HTTP protocol.
3. Header format of HTTP request and response.
4. What are the HTTP request methods?
5. What HTTP response headers do?
6. What happens to an undeliverable datagram?
7. What is HTTP session state?
8. What is the work of http in the server?
9. What are Status codes?
10. What s a Request message?
11. What are Persistent connections?
12. In non – persistent HTTP connection, how can HTTP inform the TCP protocol that the end of the message has been reached?
13. Difference between URL, URI & URN.

**A2: sub-netting**

1. **Which protocol does ping use at the network layer.**
2. **What type of ICMP packet is send when a ping request is initiated?**
3. **If a system is not responding to ping requests , what could be a possible reason**
4. **What is the similarity between ping and tracert.**
5. **Which protocol does ping use – TCP or UDP**
6. **If a system does not respond to ping, does it imply the system is shutdown?**
7. **A user on a PC pings a device which is on a different network through a router. The router is unaware of the network. What would happen?**
8. **What is the port number used by ping.**
9. **Network address:** 192.168.10.0

**Subnet mask:** 255.255.255.224

How many subnets?

How many hosts?

What are the valid subnets?

1. Write the subnet, broadcast address and valid host range for the following:
2. 172.16.10.5 255.255.255.128
3. 172.16.10.33 255.255.255.224
4. 172.16.10.65 255.255.255.192
5. 172.16.10.17 255.255.255.252
6. What do you mean by subnet mask 255.255.255.255 ?
7. Distinguish between IP v4 & IPv6 along with its address representation .
8. Difference between subnetting & supernetting .
9. What are IP address? Which are the two versions of IP addresses available.
10. What does network bits and host bits represent in an IPv4 address?
11. What is network mask? For what purpose it is needed?
12. What is the default subnet mask of class A, B and C?
13. What is subnetting?
14. What is supernetting?
15. Full form of Ping?
16. Ping belongs to which type of packet?
17. What is IP?
18. What is private IP?

Three ranges of IP addresses have been reserved for private address and they are not valid for use on the Internet. If you want to access internet with these address you must have to use proxy server or NAT server (on normal cases the role of proxy server is played by your ISP.).If you do decide to implement a private IP address range, you can use IP addresses from any of the following classes:   
Class A 10.0.0.0 10.255.255.255   
Class B 172.16.0.0 172.31.255.255   
Class C 192.168.0.0 192.168.255.255

1. What is public IP address?

A public IP address is an address leased from an ISP that allows or enables direct Internet communication.

1. What's the benefit of subnetting?

Reduce the size of the routing tables.   
Reduce network traffic. Broadcast traffic can be isolated within a single logical network.   
Provide a way to secure network traffic by isolating it from the rest of the network.

1. What are the differences between static ip addressing and dynamic ip addressing?

With static IP addressing, a computer (or other device) is configured to always use the same IP address. With dynamic addressing, the IP address can change periodically and is managed by a centralized network service

1. What is difference between physical and logical topology?

A physical topology describes how devices are physically cabled together.   
A logical topology describes how devices communicate across the physical topology

1. How many types of topology are available?

A **point-to-point topology** has a single connection between two devices.   
In a **star topology,** a central device has many point-to-point connections to other devices.   
A **bus topology** uses a single connection or wire to connect all devices.   
In a **ring topology,** device one connects to device two, device two connects to device three, and so on to the last device, which connects back to device one.

1. How many IP addresses can come in IPV4? In IPv6?
2. How IPv6 address is represented?
3. Can you explain the concept of Unicast IP address?
4. Can you explain the concept of IP multicasting or multicast IP address?
5. How many different types of subnet classful networks are present?
6. What are the IP address ranges for public and private IP address?
7. Why do we need class and how many different types of class exists?
8. How are the IP addresses distributed between different classes?
9. What is classful IP addressing?
10. Explain the concept of subnetting?
11. What are the advantages of using subneting?
12. If the host has the subnet ID why do we need a subnet mask?
13. How is network address calculated from the subnet?
14. What is the advantage of using classless addressing over classful addressing scheme?
15. Can you explain the concept of CIDR?
16. Twist :- Can you explain superneting ?
17. Can you explain concept of custom subneting?
18. What is the implication of increasing and decreasing subnet Bits?
19. Why do we need to subtract two from number of hosts?
20. Where do we use cross and standard cable?
21. Computer to computer ==> cross   
    Switch/hub to switch/hub ==>cross   
    Computer to switch/hub ==>standard

**A3: Packet Sniffing**

1. What do you understand by port ? Enlist port numbers of various protocols & unspecified range of port numbers.
2. How can you find which transport layer protocol like RTP or SCTP is used to segregate the sniffed packets?
3. Enlist at least 10 sniffing tools.
4. How does sniffing / wiretap work?
5. What do you understand by online & offline sniffing?
6. Discuss the library & system call used for packet sniffing in multicore way .
7. What is scapy tool & parallel python multiprocessing library used for ? Explain in brief .
8. Discuss methods to detect packet sniffing.
9. Elaborate applications of packet sniffing.
10. Design mathematical model for packet sniffing function with input analysis .
11. What could be the success & failure case of packet sniffing assignment ?
12. Explain raw socket in brief.
13. Draw the header format for ICMP.
14. Distinguish between ARP & RARP with appropriate examples.
15. What is the significance of protocol field in the IP protocol header format?
16. Explain all the types of sockets.
17. What are the arguments & return type of socket API?
18. Is it possible to sniff packets with your program in bus topology?
19. Is network monitoring legal? OR Debate Packet Sniffing a “curse” or a “boon”.
20. How can you detect sniffer running on your machine?
21. How can one protect from sniffer?
22. Can sniffer tools used on wireless networks?

**A4: DHCP**

1. Which networking protocol is used to find the mac-address corresponding to a specific IP address on the network?
2. **What is DHCP?**
3. **Can a BOOTP client boot from a DHCP server?**
4. **What is DHCP’s purpose?**
5. **What is a DHCP lease?**
6. **How long should a lease be?**
7. **What is a MAC address?**
8. **What protocol and port does DHCP use?**
9. How DHCP Works?
10. What is the dhcp process for client machine?
11. What is the default port for ssh? How will you change it to some other random port no.?
12. DHCP default and max lease time.
13. Host specific configuration.
14. What is the port number & use of ssh ?
15. Compare & contrast between DHCP & BOOTP.
16. What is full form DHCP and how will you configure it?
17. What is DHCP scope?

A scope is a range, or pool, of IP addresses that can be leased to DHCP clients on a given subnet.

1. What is a subnet mask?

Subnet mask is a 4 byte (32 bit) number used to identify the sub-network ID and the host ID from an IP address. All the hosts in a sub-network will have the same subnet mask. E.g. 255.255.255.0, 255.255.127.0, 255.255.0.0

**A5: LAN setup**

1. What is SAN?
2. What is NAS?
3. What are the differences between SAN,NAS, DAS?
4. How SAN is better than NAS?
5. What is RAID?
6. How SAN can be accessed? Which protocols support to access the SAN?
7. Draw the architecture of SAN?
8. Explain How LAN can be setup? Ie. Wired LAN , Wireless LAN
9. What is fibre channel SAN?
10. What is mean by DSP Data?
11. What do you mean by network standardization?
12. What is straight and cross connections?
13. What type of cables are used in our labs and why?
14. What is the topology of a lab in PICT?
15. What is topology of PICT?
16. What is bandwidth available in PICT Labs?
17. What is supported data rate by Ethernet 802.3?

18. What is the difference between Hub, Router and a switch?

19. What type of switches are used in our PICT labs?

1. Wi-Fi is a standard, so is Ethernet. Identify the name of the standard for each of these communications protocols.
2. Who can contribute to Internet standards?
3. write IEEE standards for (ans given)

Ethernet 802.3

Wi-Fi 802.11

Wimax 802.15

Token ring 802.5

Bluetooth: 802.15.4

1. [What is the difference between a hub and a switch?](http://compnetworking.about.com/library/tips/blfaq011.htm)

**Socket programming:**

1. When does data transfer commence in a TCP based communication.
2. Name two common fields which are available in TCP and UDP headers.
3. Explain socket APIs with list of arguments and return types.
4. Explain IPv4 socket address structure.
5. What is bind API used for?
6. Is there any difference between read ( ), write ( ) APIs & sendto ( ) ,recvfrom ( ) APIs ?
7. What is the need of socket in the program?
8. What is the need of port?
9. What is meaning of value of last parameter of socket API ?
10. Which family of socket programming do we use to create a UDP packet?
11. What are the tools and methods that you have implement in the concurrent text conferencing assignment?
12. Two users are accessing a Network application simultaneously. Which fields in the TCP/IP header would the server use to distinguish between the connections?
13. A web client opens two instances of a website using a browser. Which of the fields would be different for both the connections?
14. How to create raw socket?
15. How multicore functionality has been used for packet sniffing? Write the code for same.

Ftp, tftp, telnet:

1. **What is FTP?**
2. **How does Active FTP communication Work.**
3. **How many TCP connections are used by Active and Passive FTP respectively.**
4. **Security concerns of ftp.**
5. **Anonymous ftp.**
6. Whether FTP is out – band or in – band service ? Justify why so . Give the port numbers .
7. What is tftp?
8. Transport layer protocol in tftp.
9. Difference between ftp and tftp.
10. Port used in tftp.
11. Security in tftp.
12. Compare & contrast ftp with telnet
13. What is anonymous user in FTP ?
14. What is vftpd?
15. telnet vs TELNET
16. How exactly file is transferred in your socket programming? Whether FTP uses telnet as its underlying technique to transfer the file?
17. Draw the state diagram of working of FTP.
18. What is the difference between AF\_INET & PF\_INET in socket structure?
19. Represent the client – server architecture mathematically by making suitable assumptions.
20. Which transport layer protocol is used by FTP?
21. What are the commands of FTP for transferring multiple files ?
22. Enlist few response codes along with respective phrases of FTP .
23. FTP uses the services of TCP for exchanging control information & data transfer . Could FTP have used the services of UDP for either of these two connections ? Explain.
24. FTP uses two separate well – known port numbers for control & data connection . Does this mean that two separate TCP connections are created for exchanging control information & data?
25. What is FTP?
26. FTP is short for File Transfer Protocol. This is the protocol used for file transfer over the Internet.

**B2: streaming video server and displaying video at client side using Java.**

1. Explain working of RTP and RTSP.
2. Explain the format of RTP packet.
3. What is SAN? How it works?
4. What is streaming?
5. What are the differences between HTTP and RTSP?
6. Why does RTP need the service of another protocol, RTCP, but TCP do not?
7. Can we say UDP plus RTP is the same as TCP?
8. How secure is VoIP?
9. Compare & contrast SIP with H.323
10. Can the combination of RTP / RTCP & SIP operate in a wireless environment? Explain.
11. Explain why RTP cannot be used as a transport – layer protocol without being run on the top of another transport – layer protocol such as UDP.
12. Both TCP & RTP use sequence numbers. Do sequence numbers in these two protocols play the same role? Explain.
13. Can H.323 also be used for video?

**Proxy Server**

1. Explain the difference between Web server and Proxy server?
2. How to implement proxy-to-proxy server program?
3. In our college, which proxy server we are using?
4. Why we should use SAN?
5. What is squid?
6. What is default port of squid proxy?
7. What are the functionalities of squid proxy server?

**C5: Installation and setup to control the remote machine.**

1. What is Virtual Network Computing (VNC) protocol?
2. List what are the tools available for controlling the remote machine.
3. Name two networking protocol which can be used to view the desktop of a remote system?

**Dual stack IPV6 and IPV4 implementation.**

1. What is dual stack operation?
2. Explain IPv4 and IPv6 addressing structure.
3. What is the difference between IPv4 and IPv6?
4. What is the address space supported by both the versions?
5. What is Multicasting?
6. What is meant by path MTU?
7. What is jumbogram?
8. What is tunneling?
9. Address representation in IPv6.
10. Security provisions in IPv6.

**Routing:**

1. What are the duties of network layer?
2. What are the contents of routing table?
3. What are the routing strategies?
4. List out atleast three purposes of routing algorithm.
5. What are the challenges of routing?
6. List the routing protocols.
7. What is RIP?
8. Working principle of distance vector routing and link state routing. What are the differences?
9. Routing protocols based on distance vector approach.
10. Routing protocols based on link state algorithm.
11. Explain four timers of RIP.
12. Compare Bellman Ford & Dijkstra’s algorithm.
13. Differentiate between Routing & Forwarding.
14. Enlist types of Routing Algorithms.
15. Discuss the requirements of good routing algorithm.
16. Discuss & justify disadvantages of DVR.
17. How switching table is build?
18. Describe difference between a routing protocol & routing algorithm.
19. Explain difference between routers & layer 3 switching OR Explain differences between among layer 2 , layer 3 & layer 4 switching
20. Hop count increases at router or switch?
21. What is the indication of arriving convergence phase in DVR?
22. What are alternative approaches of programming congestion control & DVR algorithms ?
23. Differentiate between congestion & collision.
24. What parameters does router needs to know to route a packet?
25. Represent DVR graphically with weighted matrix.
26. Differentiate between Link State Routing & Distance Vector Routing.
27. Explain the important phases of DVR
28. Explain the programming modules for DVR or RIP assignment with their dependency among functions .
29. Represent the network in set theory form mathematically .
30. Explain DVR algorithm .
31. What is distance vector routing?
32. Name two routing protocols which use TCP and UDP respectively.

**Videoconferencing:**

1. Explain the detail of VoIP Protocols?
2. VoIP stands for?
3. Explain the various VoIP tools?
4. Explain what is SIP?
5. Explain H.323?
6. Explain RTP?
7. What are different VoIP tools?

**NS3:**

1. What do you mean by simulation?
2. What is difference between simulation and emulation?
3. What is The difference between ns-2 and ns-3 ?
4. Explain some features of Ns-3?
5. Can you simulate distributed environment using Ns-3?
6. How will you write a code to define a node in Ns-3?
7. How will you write a code to define a link between ?
8. Write a script to define two nodes and a link between them in Ns-3?
9. How will you generate FTP Traffic in NS-3?
10. How will you install a routing protocol on a node in Ns-3?
11. How will you install a application on a node in Ns-3?
12. How will you establish a TCP connection in NS-3?

**Congestion control:**

1. Explain 3 dup ack process.
2. What are the congestion control algorithms.
3. Draw well labeled state diagram of congestion control algorithm.
4. Perform input analysis mathematically of congestion control assignment.
5. What is the difference between flow control & congestion control?
6. Explain stop & wait protocol functionality.
7. What do you understand by ‘ End – to – end congestion control ’ & ‘ Network – assisted congestion control ’
8. How will you be able to simulate congestion control approach through NS tool?
9. How can you perform congestion control assignment for different flavor of TCP? What are the different flavors of TCP? What do you mean by TCP friendly?
10. What are slow start & congestion avoidance algorithm?
11. What do you understand by fast recovery & fast retransmission process for congestion control?

**TCP And UDP, SCTP:**

1. TCP state transition diagram, three way handshake for connection establishment, four way handshake for connection termination.
2. Describe why an application developer might choose to run an application over UDP rather than TCP.
3. Most of the flags can be used together in a segment . Give an example of two flags that cannot be used simultaneously because they are ambiguous .
4. UDP is message oriented protocol. TCP is byte – oriented protocol . If an application needs to protect the boundaries of its message, which protocol should be used , UDP or TCP ?
5. Qu. 9. TCP header dump in hex :

E293 0017 00000001 00000000 5002 07FF …

What is source port?

What is destination port?

What is sequence number?

What is acknowledgement number?

What is the length of header?

What is the type of segment?

What is window size?

1. Define the urgent & push features of TCP.
2. Lost TCP acknowledgements do not necessarily for retransmissions . Explain why ?
3. How to detect that the other end of a TCP connection has crashed ? Is it necessary to use ‘keepalives’ for this?
4. How & where does fragmentation happens ?
5. Prepare a chart distinguishing various application layer protocol based on properties like port no. , rfc , underlying connection (TCP/UDP) , out–band – in–band , purpose , example , header specifications.
6. How to detect the sctp connection is lost [ closed ] ?
7. 15 Write port Numbers of each of the protocol (ans are given)

1.HTTP 80

2.FTP 20 Data 21 contl

3.SMTP 25

4.Telnet/SSH 23/22

5.DHCP UDP 67,68

6.POP3 TCP 110

**Application, Presentation, Session Layer:**

1. What is the difference between a name server & a resolver in DNS ?
2. TCP is full – duplex protocol , yet SMTP uses TCP in a half – duplex fashion . The client sends a command then stops & waits for the reply . Why doesn’t the client send multiple commands at once , e.g. single write that contains HELO , MAIL , RCPT , DATA & QUIT commands ( assuming that body isn’t too large ).
3. Classify DNS resolver & a DNS name server as either client , server or both.
4. What is the DNS forwarder?

DNS servers often must communicate with DNS servers outside of the local network. A forwarder is an entry that is used when a DNS server receives DNS queries that it cannot resolve locally. It then forwards those requests to external DNS servers for resolution.

1. Which command will you use to find out the name of the pc in networks?

NSLOOKUP [192.168.0.1]   
[Ip of target computer]

1. How to determine whether there is an issue with the DNS configuration of your connection to your ISP?

At a command prompt, type ipconfig /all and then press ENTER to display the IP address of your DNS server. If the IP address for your DNS server does not appear, you need contact your ISP.

1. What do you need to do that your browser will point URL www.example.com to the internal IP address 127.99.11.01?

Make changes in the hosts file in C:\WINDOWS\system32\drivers\etc   
The Hosts file is looked at first before going out to the DNS (Domain Name Service) servers. you have to put the following on new lines at the end of hosts file:   
127.99.11.01 example.com   
127.99.11.01 www.example.com

1. What is FQDN?

An FQDN contains (fully qualified domain name) both the hostname and a domain name. It uniquely identifies a host within a DNS hierarchy.

1. Are the HELO & MAIL FROM commands both necessary in SMTP ? Why ?or Why not?

**General questions:**

1. Header structures of IPv4, IPv6, TCP, UDP, ICMP.
2. Explain OSI model.
3. Explain TCP/IP protocol stack.
4. Explain the addresses used at each layer of TCP/IP protocol suite.
5. Explain the protocols used at each layer of TCP/IP model.
6. What are the devices used at each layer of TCP/IP model.
7. [What is an intranet?](http://compnetworking.about.com/library/tips/blfaq006.htm)
8. [Why do IPX games work but TCP/IP games fail?](http://compnetworking.about.com/library/tips/blfaq007.htm)
9. [How fast can a normal Null Modem cable transfer files?](http://compnetworking.about.com/library/tips/blfaq008.htm)
10. [Who invented the IP - the Internet Protocol?](http://compnetworking.about.com/library/tips/blfaq009.htm)
11. Define protocol?
12. What do you mean by connection oriented and a connection less service?
13. Principles used in Defining OSI layers . What are the two reasons for using layered protocol? Describe problems with layering.
14. ISO stand for?
15. OSI stand for?
16. Which OSI layer does IP belong?
17. Explain the concept of OSI layer?
18. Explain the different layers in OSI model?
19. Explain Application layer in OSI model?
20. Explain Presentation layer in OSI model?
21. What's the concept of Simplex, Half Duplex and Full Duplex dialogs?
22. What are the different types of dialogs in Session layer?
23. Explain Transport layer in OSI model?
24. Explain the concept of Congestion?
25. Explain Network Layer?
26. Explain Data link Layer?
27. Is it compulsory that compression, encryption and translation functions will be used during communication?
28. Explain Session layer in OSI model?
29. Explain IP protocol?
30. What is the minimum and maximum size of an IP datagram header?
31. To which OSI layer does IP belong?
32. What do you mean by IP is an unreliable protocol?
33. What do you mean by IP is a best-effort protocol?
34. [What is (wireless / computer) networking?](http://compnetworking.about.com/cs/basicnetworking/f/whatsnetworking.htm)
35. [What is client/server networking?](http://compnetworking.about.com/library/tips/blfaq003.htm)
36. [What is peer-to-peer networking?](http://compnetworking.about.com/library/tips/blfaq005.htm)
37. "Is there a way to transfer files between two PCs using a cable called a null modem cable?"

Ans. Yes! This cable allows you to set up file sharing between two PCs by connecting their serial or parallel ports.

1. [How is network speed measured?](http://compnetworking.about.com/od/basicnetworkingfaqs/f/bandwidthunits.htm)

**Answer:** Measures of computer network performance are commonly stated in units of *bits per second (bps)*. This quantity can represent either an actual data rate or a theoretical limit to available network bandwidth.

Modern networks support very large numbers of bits per second. Instead of quoting 10,000 bps or 100,000 bps, networks normally express these quantities in terms of larger quantities like [kilobits, megabits and gigabits](http://compnetworking.about.com/od/basicnetworkingconcepts/g/bldef_kilobit.htm).

1. [What is a port and what are port numbers?](http://compnetworking.about.com/library/tips/blfaq012.htm)
2. Explain the Physical layer?
3. Explain what an IP address?
4. When were OSI model developed and why its standard called 802.XX and so on?
5. OSI model was developed in February1980 that why these also known as 802.XX Standard (Notice 80 means ==> 1980, 2means ==> February)
6. How many pins do serial ports have?
7. In computer it's known as com port and could be available in 9pin or 25 pin. On router it have 60 pins.
8. What is APIPA?

Automatic private IP addressing (APIPA) is a feature mainly found in Microsoft operating systems. APIPA enables clients to still communicate with other computers on the same network segment until an IP address can be obtained from a DHCP server, allowing the machine to fully participate on the network. The range of these IP address are the 169.254.0.1 to 169.254.255.254 with a default Class B subnet mask of 255.255.0.0.

1. What are the LMHOSTS files?

The LMHOSTS file is a static method of resolving NetBIOS names to IP addresses in the same way that the HOSTS file is a static method of resolving domain names into IP addresses. An LMHOSTS file is a text file that maps NetBIOS names to IP addresses; it must be manually configured and updated.

1. What is sliding window protocol? In which layer of OSI does it perform?
2. What would be the standard size (formula) of the window if there are n frames?
3. Draw the IP datagram header format. “ IP datagram has a checksum field still it is called an unreliable protocol ” . Justify.
4. What is the advantage of keeping checksum filed turned off & when it is appropriate to keep checksum filed turned off ?
5. Does a wireless network offer all OSI functions ?
6. Explain hidden terminal & exposed terminal problem along with its solution.
7. What is the difference between permanent address & care – of – address ? Who assigns a care – of – address ?
8. Consider two mobile nodes in a foreign network having a foreign agent . Is it possible for two mobile nodes to use the same care – of address in mobile IP ? Explain your answer .
9. What is the best tool / command to measure RTT ?
10. What do you mean by heterogeneous system
11. What are the system calls or APIs you have used for B5 assignment ?
12. What is micro – browser ?
13. How does Bluetooth relates to WAP ?
14. What are the advantages & drawbacks of wireless information transmission when compared to the transmission methods using guided media ?
15. How does the MAC layer in 802.11 networks detect collisions ?
16. Is it possible for a station belonging to an 802.11 network to transmit a frame to another station belonging to the same BSS using AP ?
17. Why does PCF always have priority over DCF ?
18. How are Bluetooth piconets joined into a scatternet ?
19. Why was master – slave architecture chosen for Bluetooth ?
20. What are the disadvantages of implementing TCP / IP directly over mobile network ?
21. What is IP?
22. What is the use of Type Of Service field in the IP header?
23. What are the fields in an IP datagram header?