10CS64-Computer Networks-II
Question Bank
PART –A

Unit -1 PACKET SWITCHING NETWORKS-I: In this chapter we learn what is packet switching networks, general issues regarding packet switching networks. We examine typical configurations of packet switching networks. We introduce ourselves to the basic approaches to operate a packet switching network.We also learn basic approaches to selecting routes across the network and examine how routing tables in a network steer packets from the source to the destination. We learn shortest path routing algorithms -Bellman-Ford .

1.	Explain and derive delays in Datagram packet switching and compare it with message switching	10marks*
2.	What are datagram and virtual circuits? Distinguish between them.	10marks*
3.	Consider the network given below in figure .i) Use the Dijkstra's Algorithm to find the shortest path from source node 5 to all other destination node. ii) Find the shortest path tree from node 5 to other nodes. ii) Find the set of associated routing table entries. 	10marks*
4.	Why is packet switching more suitable than message switching for interactive applications? Compare the delays in datagram packet switching and message switching.	06marks*
5.	Compare Bellman-Ford Algorithm and DijKstra's algorithm for finding the shortest paths from a source node to all other nodes in the network.	08marks*
6.		06marks*
7.	Define the two types of network services and distinguish between both.	06marks
8.	Explain with a neat diagram the service offered by the network and its internal operation?	
9.	State and explain end to end argument for system design.	06marks
10.	Explain with an example how oversubscription is used to access portion of packet switching networks and to optimize the use of bandwidth resources.	05marks.
11	With reference to Campus network, explain how LAN's Provide access to packet switching networks in many environments.	06marks.
12.	a) State and explain Message switching with diagram. b) Explain the minimum delay incurred when message is transmitted over a path	08marks

	that involves two intermediate switches.	
13.	a) State and explain datagram packet switching with diagram. b) Explain the minimum delay incurred when message is broken into three separate packets.	10marks
14.	Explain packet switching network with external view and internal view.	5marks
15.	What are VCIs? Explain virtual circuit packet switching with a diagram.	10marks
16.	Differentiate between intra domains and inter domain networks.	5marks
17.	Explain connectionless packet switching. Show how the minimum delay incurred when a message transmitted is 3τ+3T	7marks
18.	Compare the operations of the layer 3 entities in the end systems and in the routers inside the network.	6marks
19.	Explain cut –through packet switching and list its applications.	5marks
20.	Explain in detail the structure of a packet switch with diagrams.	10marks
21.	Explain 8x8 banyan switching.	6marks
22.	What are the goals of routing algorithms?	7marks
23.	Classify the routing algorithms with brief explanation.	4marks
24.	Explain hierarchical routing with example.	10marks
25.	State and explain how flooding occurs when initiated from one node say node 1 as example.	6 marks
26.	Explain the concept of deflection routing.	6marks
27.	Explain with an example the working principle of Bellman-Ford algorithm.	10marks
28.	Compare source routing versus Hop-by-Hop routing.	5marks
29.	Compare link-state routing versus distance vector routing.	5marks
30.	Compare TDM v/s Packet Switching.	2marks
31.	Explain Dijkstra's Algorithm with an example.	8marks
32.	Compare circuit switching , packet switching and message switching.	10 marks
33.	When two routers use a routing protocol to exchange routing information, must they share common information?	5 marks
34.	Define Routing and its goals.	6marks (Dec 2015)
35.	Differentiate between connection oriented and connectionless services	4marks (Dec 2015)
36.	Explain datagram and virtual circuit packet switching with delay calculation diagrams	8marks (Jun'15)
37.	With neat diagram, explain the generic packet switch.	4marks (Jun'15)

Unit -2 PACKET SWITCHING NETWORKS-II: In this chapter we discuss packet level traffic management concerned with packet queuing and packet scheduling operating in short time scale. We learn and discuss about traffic management at flow level using approaches like admission control and congestion control operating in medium time scale and extend our learning process to traffic management at the flow aggregate level operating in a long time scale.

1.	Explain the FIFO and priority queue scheduling for managing traffic at packet level.	10marks*
2.	Explain the Leaky bucket algorithm for policing the traffic at flow level.	10marks*
3.	With a neat diagram explain leaky bucket policy.	08marks*
4	Explain the following fields in the IP Packet header i) time to live ii) fragment offset iii)header checksum	06marks*
5.	A large number of consecutive IP address are available starting at 200.40.160.0. Suppose that 3 organizations A,B,&C request 4000 , 2000 and 1000 addresses respectively in that order. For each of these , give the first IP address assigned ,the last IP address assigned and the mark in the w.x.y.z/s Notation	06marks*
6.	Explain identification, flags and fragment offset field in the IP version 4 header.	06marks*

7.	An university has 150 LANs with 100 hosts in each LAN.
	    i) Suppose the university has one class B address .Design an appropriate subnet addressing scheme.
	    ii) Design an appropriate CIDR addressing scheme.
		04marks*

8.	Consider a packet-by-packet fair queuing system with three logical buffers and with a service rate of one unit/second.Show the sequence of transmissions for this system for the following packet arrival pattern: Buffer 1 :arrival at time t=0,length =2 ; arrival at t=4,length =1 Buffer 2 :arrival at time t=1,length =3 ; arrival at t=2,length =1 Buffer 3 :arrival at time t=3,length =5 ;	10marks*
9.	What is the meaning of traffic management?	2marks
10.	Explain FIFO queuing with priority?	5marks
11.	What are the strategies used in the internet to provide Qos at flow level.	4marks
12.	Write a note on random early detection.	5marks
13.	Write a note on closed loop control.	10marks
14.	Explain head-of-line priority queuing.	8marks
15.	Explain fluid –flow and packet by packet fair queuing.	8marks
16.	Write in brief about weighted fair queuing.	6marks
17.	Explain policing and traffic shaping with respect to leaky bucket.	10marks
18.	Discuss how traffic is mapped on the network topology. Or write a short note on traffic engineering Or traffic management at flow aggregate level.	7marks
19.	What are the approaches to congestion control at network layer?	8marks

Unit-3 TCP-IP-I: In this chapter we learn TCP/ IP architecture and commonly used definitions. We examine the structure of the network layer: the IP packet; IP addressing, routing and fragmentation and reassembly. We discuss how IP is complemented by ICMP. We discuss the motivations for introducing a new version of IP, and describe the features of IP version6.We continue to learn in detail the structure of UDP

1	With a schematic explain the TCP/IP architecture.	10marks
2	Explain IP packet header.	10marks
3	Explain the need for classification of IP Addressing and Subnet addressing?	5marks
4	Explain with an example the role of Subnet mask.	4marks
5	Write a short note on Classless Inter domain routing.	10marks
6	Explain ARP and RARP.	10marks
7	Write a short note on fragmentation and reassembly.	5marks
8	Explain Internet control message protocol.	5marks
9	Explain ICMP basic error message format.	5marks
10.	Explain the IP address classification. Identify the following IP addresses and their address class: 200.58.20.165 128.127.23.20 16.196.128.50 150.156.10.10	10marks*
11.	Give the format of IPV6 basic header.Explain the importance.	10marks*
12.	What is the need to change from Ipv4 to Ipv6? Write the Ipv6 basic header and describe its fields.	10marks*
13.	What are the changes from Ipv4 to Ipv6?	8marks
14.	What is the role of extension headers in Ipv6?	4marks
15.	Write short note on user datagram protocol.	5marks
16.	i) A small organization has a class C address for seven networks each with 24 hosts. What is an appropriate subnet mask? ii) Perform CIDR aggregation on the /24 IP address 200.96.86.0/24, 200.96.87.0/24, 200.96.88.0/24, 200.96.89.0/24.	6marks (June'15)
17.	A host in an organization has an IP address 150.32.64.34 and subnet mask 255.255.240.0. What is the address of this subnet?	6marks (Dec2015)
18.	Give the format of IPv6 basic header. Compare Ipv6 with Ipv4.	7marks (Dec2015)

Unit-4 TCP/IP-2: We learn TCP ,Internet routing protocols, multicast routing and two key protocols DHCP which provides a mechanism for the temporary allocation of IP addresses to hosts; mobile IP allows a device to use the same IP address regardless of the network it is attached.

1.	Explain the OSPF protocol and its operation	10marks*
2.	Describe how TCP establishes the connection using a three way handshake procedure.	08marks**
3.	What is routing information protocol (RIP) ?what is the maximum width of a RIP network.	02marks*
4.	Explain in detail the operation of OSPF.	12marks*
5.	Explain the key features of TCP.	5marks
6.	Explain Nagles's algorithm.	5marks
7.	Explain how congestion is managed effectively by TCP.	10marks
8.	Explain connection establishment process in TCP.	10marks
9.	Write a schematic and explain TCP segment format.	5marks

10.	Explain the operation of routing information protocol.	5marks
11.	List in brief the features of OSPF.	10marks
12.	What is DHCP, explain its operation.	7marks
13.	Explain the concept of network address translation.	8marks
14.	Explain the operation of Mobile IP.	10marks

15.	What is-
	    i) Unicast Addressing
	    ii) Multicast Addressing
	    iii) Anycast Addressing
		6marks

16.	Explain the migration issues from Ipv4 to Ipv6?	6marks
17.	Explain the format of TCP segment.	10marks
18.	Write short note on Multicast Routing.	10marks
19.	Explain in detail IGMP	8marks
20.	What are the protocols developed to automate the configuration process.	12marks
21.	Write a short note on a) DHCP b) NAT c)MOBILE IP	10marks
22.	Explain how the use of hierarchy enhances the scalability in the following aspects of internet a) domain name system b) IP addressing c) OSPF addressing d) Interdomain routing	12marks
23.	Write note on: i) Reverse path multicasting ii) Mobile IP	6Marks (June'15)

PART-B

Unit-5: Applications, Network Management, Network Security : In this chapter we examine the internet applications and their supporting protocols and services. These services demonstrate how users perceives a computer network and express the power of internet technology. We learn the concepts of network security as computer networks need provisions that secure data from possible intrusion. Security is especially crucial in wireless networks, as wireless medium, by its nature, is vulnerable to intrusions and attacks.

1.	What is DNS? Explain the following
	    i) Domain name space
	    ii) Name/Address Mapping
		10marks*

2.	Write a note on only Two : i) Remote login protocols ii) File transfer and FTP iii) World wide web and HTTP.	8marks* (Jun'14)
3.	Define network management and explain SNMP and SNMP messages.	6marks (Jun'14)
4.	Compare secret key and public key cryptography systems.	6marks* (Jun'14)
5.	Explain the remote login protocols. (06Marks)	6marks* (Jun'15)
6.	What are the elements of network management? Discuss the interaction between SNMP management station and SNMP agent. (08Marks)	8marks* (Jun'15)

7.	Write RSA algorithm. For RSA algorithm of 4 bit message 1001, choose a = 3 and b = 11, find the public keys and private keys for this and show the cipher text	6marks* (Jun'15)
2.	Give the comparison between public key and secret key cryptographic systems	10marks*

3.	Apply RSA and do the following : i) Encrypt a=3 ,b=11 , x=3 , and m=9
	       ii)Find the corresponding y
	       iii) Decrypt the cipher text.
		06marks*

4.	Explain the detail, any two major categories of threat to network security.	08marks*
5.	Write a short note on SNMP.	06marks*
6.	What are the functions performed by a network management system.	05marks*
7.	What are SNMP, SMI and MIB?	03marks*
8.	Explain the RSA algorithm .Using the encrypt the following : p=5, q=11,e=7,P=18	12marks*
9.	Explain five functions performed by network management system.	10marks
10.	With schematic, explain the elements by network management system.	05marks
11.	Explain the components of SNMP.	05marks
12.	Explain the structure of management information SNMP.	10marks
13.	Write a short note on remote network monitoring.	05marks
14.	What are the typical security threats that can arise in a network setting.	05marks
15.	Explain the security requirements for information transmitted over network.	05marks
16.	Explain the basic building blocks of cryptography.	04marks
17.	With examples explain the following i) substitution cipher ii) Transposition cipher	06marks
18.	Explain the secret key cryptography.	05marks
19.	With an example, explain public key cryptography.	05marks
18.	Explain DES Standard.	10marks
19.	With an example ,explain RSA algorithm	10marks
20.	What are the responsibilities of network administrator?	5marks
21.	What is the necessity of network management?	3marks
22.	Describe the network management model by ISO.	5marks
23	What is the goal of security management?	04marks
24	Explain and justify the architecture of network management system with an analogy.	06marks
25	Explain the role played by MIB.	07marks
26	List the roles played by the network management protocol.	05marks
27	Compare and contrast simple network management and Internet Management.	06marks
28	Explain SMI.	05marks
29	Explain the hierarchy of Object Identifier tree.	05marks
30	Describe SNMP in request-response mode.	05marks
31	Explain SNMP PDU format.	05marks
32	Justify the suitability of SNMP over UDP.	04marks
33	List and explain different types of PDUs.	06marks
34	Why do we need a command generator in SNMP applications?	04marks
35	Explain the matured architecture of SNMP. Explain the generation and processing of SNMP PDUs	08marks
36	Explain the support of SNMP towards security.	05marks
37	Is a network manager benefit from network management tools? Describe 5 scenarios.	05marks
38.	What are the 5 areas of network management defined by ISO?	05marks

39.	What is the difference between network management and service management?	05marks
40.	Define the following. a. Managing entity. B. managed device c. management agent d. management protocol	04marks
41.	Explain trap message in SNMP.	04marks
42.	What is meant by 'SNMP engine'?	03marks
43.	Explain IPSec. Give the format of Authentication Header.	05marks
44.	Explain DES Algorithm.	08marks
45.	Explain RSA Algorithm.	08marks
46.	What are the applications of network management?	05marks
47.	Differentiate between symmetric and asymmetric key cryptography	08marks
48.	If user A has public key Ya=9 ,primitive root =2. what is A's private key Xa ?	05marks
49	List the information processing functions the DNS server can handle	08marks
50	Explain domain name space with example	05marks
51	Explain DNS message format	06marks
52	What are the two remote login protocols and explain with example.	10marks
53	Explain how two users exchanging e-mail through SMTP	06marks

54	Explain the following protocol
	  i) FTP
	  ii) Secure Copy Protocol
	  iii) HTTP
		10marks

55	Explain the overview of AES protocol	10marks
56	Explain the secure hash algorithm	06marks
57	What are firewalls? How do you configure a secured network using a firewall	06marks
58	Explain the routing table poisoning and denial-of service attacks.	8marks (Dec2015)
59	Define network management and explain SNMP and SNMP messages.	8marks (Dec2015)
60	Differentiate between DES and RSA.	4marks (Dec2015)

Unit-6: Qos, VPNs, Tunneling, Overlay Networks.

1.	Explain the need for overlay networks and P2P connection	10marks*
2.	Explain VPN and its types based on tunneling	10marks*
3.	What is a virtual private network (VPN)? Mention the different types of VPN and benefits of deploying a VPN.	06marks*
4.	What is an MPLS network? Explain MPLS operation.	08marks*
5.	Explain the operation of fair queuing scheduler in context with packet scheduling of integrated service.	06marks*
6.	Discuss the concept of tunnel and point to point protocol in context with UPN.	08marks*
7.	Give the overview of QoS methods in integrated services.	05marks
8.	Write a short note on Integrated Services QOS.	06marks
9.	Explain the leaky bucket traffic shaping algorithm with state diagram and algorithm	10marks
10.	Explain Token Bucket Traffic Shaping	06marks
11.	Differentiate between leaky bucket and token bucket traffic shaping.	06marks

12.	What is RSVP? Give the overview of Differentiated Services QoS in detail.	04marks
13.	Each output port processor unit of a router has four inputs designated to four different flows. The unit receives the packets in the following order during a period in which the output port is busy but all queues are empty. Give the order in which the packets are transmitted. Flow:1, 1, 1, 1, 1, 1, 2, 2, 3, 3, 3, 4 Packet: 1, 2, 3, 4, 5, 6, 7,8, 9, 10, 11, 12 Packet size: 110, 110, 110, 100, 100, 100, 100, 200, 200, 240, 240, 240 a. Assume a fair queuing scheduler. b. Assume a weighted fair-queuing scheduler with flow $i \in \{1, 2, 3, 4\}$ having weights $\omega_i \in \{10\%, 20\%, 30\%, 40\%\}$ of the output capacity, respectively	06marks
14.	Give the overview of a packet scheduler. What are the different types of scheduler? Explain.	07marks
15.	Explain cell scheduling and QoS. Suppose that four flows are processed in a router that accepts only equal-size packets. Packets in these flows arrive at the following virtual clock times: Flow 1: 4, 5, 6, 7, 9 ; Flow 2: 1, 6, 9, 12, 14 Flow 3: 1, 4, 8, 10, 12 ;Flow 4: 2, 4, 5, 6, 12 a. For each packet, give the virtual clock count at which it is transmitted, using fair queuing. If the arrival times of two packets are the same, the smaller flow number is selected. b. Now consider weighted fair queueing, whereby flows 1, 2, 3, and 4 are given 10 percent, 20 percent, 30 percent, and 40 percent of the output capacity, respectively. For each packet, give the virtual clock count at which it is transmitted.	10marks
16.	Explain the terms Virtual private networks, Remote access VPN, Site to site VPN.	06marks
17.	Write a short note on tunneling and point to point protocol.	08marks
18.	Explain how MPLS improves the overall performance and delay characteristics of Internet.	07marks
19.	Explain the routing in MPLS domains with example.	08marks
20.	What do you mean by overlay networks? List the advantages.	06marks
21.	What are the difficulties associated with RSVP?	04marks

Unit-7: Multimedia Networking

1.	Explain the JPEG compression method and still image processing	10marks*
2.	Explain the session initiation protocol	10marks*
3.	Explain in brief the structure of a SCTP packet.	06marks*
4.	Explain in brief SIP.	08marks*
5.	Design a Huffman encoder for a source generating { a_1, a_2, a_3, a_4, a_5, a_6, a_7} and with probabilities { 0.05,0.1,0.1,0.15,0.05,0.25,0.3}	06marks*
6.	Explain the typical JPEG process for production and compression of still images.	12marks*
7.	Design a Huffman encoder for a source generating { a_1, a_2, a_3, a_4, a_5, a_6} and with probabilities { 0.55,0.10,0.05,0.14,0.06,0.08,0.02}	08marks*
8.	Explain the process of voice digitization and sampling.	08marks
9.	Explain the different files in Raw image sampling and DCT.	08marks
10.	State and explain quantization and encoding.	07marks
11.	What is motion image? Explain in detail MPEG compression.	06marks
12.	Write in detail i) Limits of compression with loss. ii)Compression methods without loss.	10marks each
13.	Short note on VOIP signaling protocols.	10marks
14.	What are the factors that affect QOS of VOIP.	06marks
15.	Explain in detail session initiation protocol.	10marks
16.	With a neat diagram, explain the H.323 components and list the steps in signaling	6m(Dec'15)
17.	Explain in detail real time transport protocol.	10marks
18.	Explain RTP packet header format with fields.	10marks
19.	Write a short note on real time control protocol.	08marks
20.	Draw the format of the SR packet in RTCP.	04marks
21.	How is jitter estimated in real time traffic.	06marks
22.	Short notes on SCTP.	07marks
23.	Explain SCTP packet structure.	10marks
24.	State different messages used by SIP. Also explain their functionality	08marks
25.	Explain Shannon's Coding theorm in detail.	10marks*

Unit-8: Mobile Ad-Hoc Networks, Wireless sensor networks

1.	With an example, Explain the dynamic source routing protocol	10marks*
2.	List the security issues in adhoc networks.Explain the types of attacks	10marks*
3.	What are adhoc networks? Mention their applications types and unique features.	08marks*
4.	Explain the structure of a typical sensor node.	06marks*
5.	What are the advantages of the DEEP clustering protocol?	06marks*
6.	Explain the following i) CGSR of AD-hoc networks ii) Types of attack in Ad-hoc Networks.	10marks*
7.	Write a short note on Zigbee technology.	04marks*
8.	Briefly explain direct and multi hop routing of intra cluster routing protocol with the help of relevant diagram.	06marks*
9.	State and explain the classification of routing protocols used in Adhoc network.	06marks
10.	Explain table driven protocol DSDV.	08marks
11.	Short notes on the following a) WRP b)DSR	10marks

12.	What are the three rules, packets used by TORA and explain the concept of TORA.	06marks
13.	Distinguish between AODV and ABR protocols.	06marks
14.	Explain security of adhoc networks and various types of attacks.	10marks
15.	What are properties to be possessed by routing protocol to prevent attacks and vulnerability.	10marks
16.	What is sensor network? Explain clustering in Sensor networks.	08marks
17.	State and explain the block diagram of a typical wireless sensor node.	08marks
18.	Explain communication energy model.	10marks
19.	What do clustering protocols specify ? Explain any one clustering protocol in detail.	10marks
20.	Write Algorithm for Deep clustering.	06marks
21.	Distinguish between centralized routing and distributed routing.	05marks
22.	Distinguish and explain intra and inter routing protocols.	08marks
23.	What is a)Stateless mode b)Soft-state mode ?	06marks
24.	List the disadvantages of DSR routing ?	05marks
25.	What is LEACH routing algorithm ?	05marks
26.	List the functions of IEEE 802.15.4 physical layer.	06marks
27	Differentiate between intracluster and intercluster protocols for WSN	07marks*
28	Briefly explain the direct and multihop routing of intra-cluster routing protocol with the help of relevant diagrams.	6marks (Dec'15)