COMPUTER NETWORKS (ECEN 3132)

Time Allotted : 2¹/₂ hrs

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

Answer any twelve: 1.

Choose the correct alternative for the following

Which of the follo the OSI model?	owing layer isn't p	resent	in the	e TCP,	/IP mod	el bı	ut is i	ncluded in
(a) Network layer			(b) Session layer					
(c) Application layer			(d) Transport layer.					
The key elements of a protocol are (a) syntax, semantics & timing (c) delivery, semantics & timing			(b) syntax, semantics & jitter (d) syntax, accuracy & timing.					
Identify which of (a) Modem	the following devi (b) Repeater	ice is u	used to boost up a weak signal? (c) Switch (d) Router.					
What does MAC stand for? (a) Media Access Control (c) Memory Area Control			(b) Mass Access Control (d) Media Area Control.					
The destination a (a) 8 bytes	ddress in the Ethe (b) 4 bytes	ernet fr (c) 6	rame f bytes	format	t consist (d) 2 b	s of oytes	5	
Present day IP ac (a) 32 bits	ldresses consists c (b) 64 bits	of (c) 18	3 bits		(d) 56	bits		
 Which of the following communication is a good example of telephone network? (a) Half-duplex (b) Simplex (c) Full duplex (d) None of these. 								
For Stop-and-W acknowledgment (a) n	Vait ARQ, for n is are needed? (b) 2n	pack (c) n-	kets •1	sent,	which (d) n+	of 1	the	following
Taps and drop lines are used to make connections in(a) Star Topology(b) Mesh Topology(c) Ring Topology(d) Bus Topology								
	 Which of the follo the OSI model? (a) Network layer (c) Application la The key elements (a) syntax, semar (c) delivery, semar (c) delivery, semar (c) delivery, semar Identify which of (a) Modem What does MAC s (a) Media Access (c) Memory Area The destination at (a) 8 bytes Present day IP act (a) 32 bits Which of the follo (a) Half-duplex (c) Full duplex For Stop-and-Wacknowledgment (a) n Taps and drop lin (a) Star Topology (c) Ring Topology 	 Which of the following layer isn't p the OSI model? (a) Network layer (c) Application layer The key elements of a protocol are (a) syntax, semantics & timing (c) delivery, semantics & timing Identify which of the following devi (a) Modem (b) Repeater What does MAC stand for? (a) Media Access Control (c) Memory Area Control The destination address in the Ether (a) 8 bytes (b) 4 bytes Present day IP addresses consists of (a) 32 bits (b) 64 bits Which of the following communication (a) Half-duplex (c) Full duplex For Stop-and-Wait ARQ, for m acknowledgments are needed? (a) n (b) 2n Taps and drop lines are used to mation (a) Star Topology (c) Ring Topology 	Which of the following layer isn't present the OSI model? (a) Network layer (c) Application layer The key elements of a protocol are (a) syntax, semantics & timing (c) delivery, semantics & timing Identify which of the following device is u (a) Modem (b) Repeater What does MAC stand for? (a) Media Access Control (c) Memory Area Control The destination address in the Ethernet fn (a) 8 bytes (b) 4 bytes (c) 6 Present day IP addresses consists of (a) 32 bits (b) 64 bits (c) 18 Which of the following communication is (a) Half-duplex (c) Full duplex For Stop-and-Wait ARQ, for n pack acknowledgments are needed? (a) n (b) 2n (c) n- Taps and drop lines are used to make com (a) Star Topology (c) Ring Topology	Which of the following layer isn't present in the the OSI model?(a) Network layer(b) S(c) Application layer(d) TThe key elements of a protocol are (a) syntax, semantics & timing(b) s(c) delivery, semantics & timing(d) sIdentify which of the following device is used to (a) Modem(b) Repeater(c) Memory Area Control(b) M(c) Memory Area Control(d) MThe destination address in the Ethernet frame f (a) 8 bytes(b) 4 bytes(c) 6 bytes(c) 6 bytesPresent day IP addresses consists of (a) 32 bits(b) 64 bits(c) Full duplex(d) NFor Stop-and-Wait ARQ, for n packets acknowledgments are needed? (a) n(c) n-1Taps and drop lines are used to make connection (a) Star Topology(b) M(c) Ring Topology(b) M	Which of the following layer isn't present in the TCP, the OSI model?(a) Network layer(b) Session(c) Application layer(d) TranspThe key elements of a protocol are (a) syntax, semantics & timing(b) syntax, (c) delivery, semantics & timing(b) syntax, (c) delivery, semantics & timingIdentify which of the following device is used to boos (a) Modem(b) Repeater(c) SwitchWhat does MAC stand for? (a) Media Access Control(b) Mass A (c) Memory Area Control(b) Mass A (c) Memory Area Control(c) Media A (c) 6 bytesThe destination address in the Ethernet frame formation (a) 8 bytes(b) 4 bytes(c) 6 bytesPresent day IP addresses consists of (a) 32 bits(b) 64 bits(c) 18 bitsWhich of the following communication is a good exam (a) Half-duplex(d) None ofFor Stop-and-Wait ARQ, for n packets sent, acknowledgments are needed? (a) n(b) 2n(c) n-1Taps and drop lines are used to make connections in (a) Star Topology(b) Mesh T (c) Ring Topology(d) Bus To	Which of the following layer isn't present in the TCP/IP mod the OSI model?(a) Network layer(b) Session layer(c) Application layer(d) Transport layeThe key elements of a protocol are (a) syntax, semantics & timing(b) syntax, semantic(c) delivery, semantics & timing(b) syntax, semantic(c) delivery, semantics & timing(d) syntax, accuraceIdentify which of the following device is used to boost up a w (a) Modem(b) Repeater(c) SwitchWhat does MAC stand for?(a) Media Access Control(b) Mass Access Co (c) Memory Area Control(d) Media Area CoThe destination address in the Ethernet frame format consist (a) 8 bytes(a) 8 bytes(b) 4 bytes(c) 6 bytes(d) 2 bPresent day IP addresses consists of (a) 32 bits(d) 56Which of the following communication is a good example of t (a) Half-duplex(d) None of these.For Stop-and-Wait ARQ, for n packets sent, which acknowledgments are needed? (a) n(c) n-1(d) n(d) None of these.For Stop-and-Wait ARQ, for n packets sent, which acknowledgments are needed? (a) n(b) 2n(c) Ring Topology(b) Mesh Topology(c) Ring Topology(d) Bus Topology	Which of the following layer isn't present in the TCP/IP model by the OSI model?(a) Network layer(b) Session layer(c) Application layer(c) Application layer(d) Transport layer.The key elements of a protocol are(a) syntax, semantics & timing(b) syntax, semantics & (c) delivery, semantics & timing(d) transport layer, semantics & timing(c) syntax, semantics & (d) syntax, accuracy & (e) SwitchWhat does MAC stand for? (a) Media Access Control(b) Mass Access Control (c) Memory Area Control(d) Media Access Control (c) Memory Area Control(b) Mass Access Control (d) Media Area ControlThe destination address in the Ethernet frame format consists of (a) 8 bytes(b) 4 bytes (c) 6 bytes(d) Soft bits (e) 32 bits(b) 64 bits (c) 18 bitsWhich of the following communication is a good example of telep (a) Half-duplex (c) Full duplex(c) n-1 (d) n+1Taps and drop lines are used to make connections in (a) Star Topology (c) Ring Topology(b) Mesh Topology (d) Bus Topology	Which of the following layer isn't present in the TCP/IP model but is is the OSI model?(a) Network layer(b) Session layer(c) Application layer(d) Transport layer.The key elements of a protocol are (a) syntax, semantics & timing(b) syntax, semantics & jitte (c) delivery, semantics & timingIdentify which of the following device is used to boost up a weak signal (a) Modem(b) Repeater(c) Switch(d)What does MAC stand for?(a) Media Access Control(c) Memory Area Control(b) Mass Access Control(c) Memory Area Control(d) Media Area Control.The destination address in the Ethernet frame format consists of (a) 8 bytes(c) 6 bytes(a) 32 bits(b) 64 bits(c) 18 bits(d) Simplex(c) Full duplex(b) Simplex(c) Full duplex(d) None of these.For Stop-and-Wait ARQ, for n packets sent, which of the acknowledgments are needed?(a) n(b) 2n(c) n-1(d) n+1Taps and drop lines are used to make connections in (a) Star Topology(b) Mesh Topology(c) Ring Topology(b) Mesh Topology

Full Marks : 60

 $12 \times 1 = 12$

(x) Before a message is encrypted, it is called as
 (a) Plaintext
 (b) Ciphertext
 (c) Cryptotext
 (d) Cryptonite.

Fill in the blanks with the correct word

- (xi) Protocol which is mainly used to access data on the world wide web is _____.
- (xii) The internet model consists of _____ layers.
- (xiii) A wired network that is found in a single building is a _____.
- (xiv) The ports ranging from 0 to 1023 are known as _____ports.
- (xv) In Go-Back-N ARQ, the size of the sender window must be less than ______.

Group - B

- 2. (a) Identify the five components of a data communication system.
 - (b) A network uses a fully interconnected mesh topology to connect 10 nodes together in duplex mode. Calculate the number of links that will be required to connect the nodes. [(CO2)(Analyze/IOCQ)]
 (c) Distinguish between LAN, MAN and WAN. [(CO1)(Analyze/IOCQ)]

4 + 3 + 5 = 12

3. (a) Write advantages and disadvantages of bus topology. [(CO2)(Apply/IOCQ)]
 (b) Discuss the responsibilities of the transport layer in the internet model. [(CO2)(Understand/LOCQ)]
 (c) Define encapsulation and decapsulation. [(CO2)(Remember/LOCQ)]

4 + 5 + 3 = 12

Group - C

4. (a) A bit stream 1101011011 is transmitted using the standard CRC method. The generator polynomial is $x^4 + x + 1$. Write the actual bit string transmitted.

[(CO2)(Analyse/IOCQ)]

- (b) Discuss with proper figure about the stop-and-wait ARQ for lost or damaged frame in noisy channel. [(CO2)(Understand/LOCQ)]
- (c) Classify the two common modes of transmission provided by HDLC.

[(CO2)(Remember/LOCQ)]6 + 4 + 2 = 12

5. (a) Find the CRC bits for the data string 100100. The divisor is 1101. Show that the remainder is all zero at the receiver if the data bits are received correctly.

[(CO2)(Evaluate/HOCQ)]

- (b) Draw the MAC frame for Ethernet with proper labelling. Identify the type of the following destination address:
 - (i) 6E:43:10:21:1A:FF
 - (ii) 3F:67:21:10:90:23
 - (iii) FF:FF:FF:FF:FF.FF.

[(CO2)(Remember/LOCQ)][(CO2)(Apply/IOCQ)]6 + (3 + 3) = 12

Group - D

- 6. (a) Differentiate between connection-oriented and connectionless protocol.
 - (b) Mention some of the uses of UDP protocol?

[(CO4)(Analyse/IOCQ)] [(CO4)(Remember/LOCQ)] 6 + 6 = 12

[(CO4)(Evaluate/HOCQ)]

[(CO3)(Evaluate/HOCQ)]

- 7. (a) Explain in details about the TCP 3-way handshaking.
 - (b) Describe the need of a table for a bridge.
 - (c) Write with proper explanation how socket address is represented in the transport layer. [(CO4)(Evaluate/HOCQ)]

4 + 3 + 5 = 12

Group - E

- 8. (a) Classify the two types of network architecture of Bluetooth. [(CO5)(Understand/LOCQ)]
 (b) Explain the two kinds of services of IEEE 802.11 wireless LAN.
 - (c) Discuss in details about the components involved in cryptography.
 [(C05)(Understand/LOCQ)]

4 + 4 + 4 = 12

9. (a) What is firewall? Write a short note on Proxy firewall.(b) Describe the SCO & ACL links associated with Bluetooth?

[(CO6)(Remember/LOCQ)][(CO6)(Remember/LOCQ)](2 + 4) + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	45.83	31.25	22.92

Course Outcome (CO):

After completing the course the student will be able to:

- 1. Understanding of the fundamental concepts of computer networking.
- 2. Apply the basic taxonomy and terminology of the computer networking area.
- 3. Identify the different types of network devices and their functions within a network.
- 4. Understand internetworking principles, routing principles and algorithms such as IP, IPv6, distance vector, and link state.
- 5. Conclude advanced networking concepts and advanced courses in computer networking.
- 6. Gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.