CA Test 1 & 2

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004
Department of CSE
BE CSE & SEM 5
CONTINUOUS ASSESSMENT TEST 1 Date: 09.08.2024

19Z504 – COMPUTER NETWORKS

Time: 1 Hour 30 minutes. **Maximum Marks: 50**

INSTRUCTIONS:
1. Answer **ALL**questions. Each Question carries 25 Marks.
2. In each question, subdivision a carries total of 5 marks (one mark for each question), subdivisions **b(i)** and **b(ii)**carries 5 marks each and subdivision **c** carries 10 marks each.
3. Course Outcome Table : Qn. 1 | CO1 ; Qn.2 | CO2

1.a	(5 x 1 mark = 5 marks)	BTL
i)	Match the following (i) Physical Layer (a) hop to hop communication (ii) Transport Layer (b) digital data into digital signal (iii) Network Layer (c) node to node communication (iv) Data link layer (d) Process to process communication A) (i) - (a),(ii) – (c), (iii) – (b), iv - (d) B) (i) - (b) , (ii) – (d), (iii) – (c),(iv)-(a) C) (i) - (d), (ii) – (b), (iii) – (a), iv - (c) D) (i) - (d), (ii) – (c), (iii) – (a), iv - (b)	L2
ii)	Which of the following is a broadcast device? A)Hub B) Switch C) Router D) Repeater	L1
iii)	____is the networking device that takes data sent from one LAN device and forwards it to the destination device based on MAC address. (in a homogeneous network) A) Router B) Switch C) Hub D) Gateway	L3
iv)	In _____networks the resources needed for communication between the end-systems are reserved for the duration of the session. (circuit switched / connection oriented)	L3
v)	If there are 10 nodes connected using Mesh topology (fully connected) then the number of links are 45.	L3
1. b	(2 x 5 marks = 10 marks)	
i)	Consider a source computer(S) transmitting a file of size 10^6 bits to a destination computer (D) over a network of two routers (R1 and R2) and three links (L1, L2, and L3). L1 connects S to R1; L2 connects R1 to R2; and L3 connects R2 to D. Let each link be of length 200 km. Assume signals travel over each link at a speed of 10^8 m/s. Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D?	L5
ii)	Draw the architecture of OSI reference model and brief about its features.	L2
1.c	(1 x 10 marks = 10 marks)	
i)	Suppose a 128-kbps point-to-point link is set up between the Earth and a rover	L5

	on Mars. The distance from the Earth to Mars (when they are closest together) is approximately 55 Gm, and data travels over the link at the speed of light is 3×10^ 8 m/s. (a) Calculate the minimum RTT for the link. (b) Calculate the delay × bandwidth product for the link. (c) Provide an interpretation of the bandwidth-delay product. (d) A camera on the rover takes pictures of its surroundings and sends these to Earth. How quickly after a picture is taken can it reach Mission Control on Earth? Assume that each image is 2MB in size.	
2.a	**(5 x 1 mark = 5 marks)**	
i)	The data link layer takes the packets from _____ layer and encapsulates them into frames for transmission. A)Physical Layer B) Application Layer C) Network Layer D) Transport Layer	L1
ii)	Which of the following functionality is not performed by the data link layer? A) Framing B) Error control C) Flow control D) channel coding	L1
iii)	Header of a frame generally contains _____ A) Payload B) Addresses C) Error control data D) signal	L1
iv)	In bit stuffing, each frame begins and end with a bit pattern in hexadecimal is 7E.	L3
v)	The total span of a 10 Base5 Ethernet is (including repeaters) 2500 meters	L1
2. b	**(2 x 5 marks = 10 marks)**	
i)	Given the data word 110110101and the devisor 1101. Show the generation of the codeword at the sender site and verify the same at the receiver site.	L4
ii)	Explain the need for the exponential back off algorithm in Ethernet.	L2
2.c	**(1 x 10 marks = 10 marks)**	
i)	Suppose that a sender is using ARQ to perform reliable data delivery. Draw the sliding window flow diagram for the following: 1. How many sequence numbers are required to implement stop and wait? 2. In a Go-Back N ARQ protocol, the window size is 6. Frames with sequence numbers 1,2, 3,4 and 5 have been sent . the sender just received an ACK for frame 1. Frames 6,7,8,9& 10 are waiting to be sent. Draw the time diagram along with Positions of S_n,R_n 3. Some time later, the sender transmitted frames 20, 21, 22, 23, 24, and 25; however, frame 22 got lost. If Go-Back-N is used, what frame(s) would the sender have to retransmit?	L6
	OR	
ii)	Suppose you are designing a sliding window protocol for a 1-Mbps point to point link to the stationary satellite revolving around the earth at an altitutude of 3X10^4 km. Assuming that each frame carries 1 KB of data, what is the minimum number of bits you need for the sequence number in the following cases? Hint: Use RTT (two way latency as the delay) (a) RWS=1 (b) RWS=SWS	L6