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VIT

Vellore Institute of Technology  
(Deemed to be University under section 3 of UGC Act 1956)

## Continuous Assessment Test II – March 2023

Programme	: B. Tech (CSE and its Specializations)	Semester	: Winter'22-23
Course	: Computer Networks	Code	: BCSE308L
		Slot	: G2+TG2
Faculty	: Dr. PRASAD M Dr. AMRIT PAL Prof. SAHAYA BENI PRATHIBA Dr. S A AMUTHA JEEVAKUMARI Prof. NOEL JEYGAR ROBERT V Dr. RENJITH Prof. RAJESH KUMAR	Class Nbr	: CH2022235001301 CH2022235001271 CH2022235001268 CH2022235000944 CH2022235001270 CH2022235001302 CH2022235000943
Time	: 90 Minutes	Max. Marks	: 50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.		Consider streams of 32 bits 11110100 00101111 01001001 10101100 need to be transmitted from a sender to a receiver. Equal size sections are used to transmit the data and the redundant bits. Illustrate the complete transmission process for the above-mentioned bit stream using checksum.	10
		Suppose you want to send an 8-bit data sequence 10110101 over a communication channel using a Hamming code with even parity.	
	i.	A. Determine the number of parity bits required to create a Hamming code for this message. [1 Mark]	
		B. Calculate the Hamming code for the message, including the parity bits. [2 Marks]	
2.		C. Suppose that during transmission, a bit is flipped from 1 to 0 or 0 to 1. Calculate the received message and determine the bit that was flipped in transmission. [2 Marks]	10
		D. Use the Hamming code to correct the error in the received message and retrieve the original message. [2 Marks]	
	ii.	What are some practical applications of the Hamming code in modern computing and communication systems? How might these applications be affected by advances in technology and changes in user needs? [3 Marks]	

Two neighbouring nodes P and Q use a Selective Repeat ARQ protocol with window size 9. Frames 0, 1, 2, 3, 4 and 5 are sent. For each of the following separate scenarios, discuss the significance of the receiving of,

3.                      a. An ACK 5 [2 marks] 10  
                          b. An ACK 3 [2 marks]  
                          c. A NAK 2 [2 marks]  
                          d. A NAK 4 [2 marks]  
                          e. An ACK 6 [2 marks]

As ISP is granted a block of addresses starting with 10.0.0.0/8. The ISP needs to distribute these addresses to four groups of customers as follows:

4.                      a. VIT research centre has 64 centres; each centre has 512 addresses  
                          b. VIT engineering has 32 branches; each branch needs 1024 addresses  
                          c. VIT law has 16 divisions; each division has 512 addresses 10  
                          d. VIT arts and science have 32 branches; each branch has 256 addresses

- i. Design the subblocks and give the details for each subblock. [ 8 Marks]  
 ii. Find out how many addresses are still available after these allocations. [2 Marks]

- i. In an IPv4 datagram, the value of the total length field is  $(00A0)_{16}$  and the value of the header length (HLEN) is  $(5)_{16}$ . How many bytes of the payload are being carried by the datagram? [4 Marks]

- ii. In an IPv4 datagram, the value of the header-length (HLEN) field is  $(6)_{16}$ . How many bytes of options have been added to the packet? [4 Marks] 10

5.                      iii. A datagram is carrying 1024 bytes of data. If there is no option information, find the value of the header length field. Also, calculate the value of the total length field. [2 Marks]