

**Nirma University**  
Institute of Technology  
Semester End Examination (RPR), May - 2018  
B. Tech. in Computer Engineering, Semester-V  
CE503 Computer Networks

Exam/  
Roll No.

Supervisor's initial  
with date

**Time: 3 Hours**

**Max. Marks: 100**

**Instructions:**

1. Attempt all questions.
2. Figures to right indicate full marks.
3. Assume suitable data if required and mention it

**Q-1 Answer the following** **18**

- A What is the propagation time (PT) and transmission time (TT) required to send a 7 kilobyte message if the bandwidth of network is 4 Gbps? Assume that distance between the sender and the receiver is 48,000 Km and velocity of signal is  $2.4 \times 10^8$  meter/second. 04
- B Discuss why following concept are used in different layers of computer network and what are their benefits? 04
- (i) Error Control
- (ii) Flow control
- C Compare and contrast between TCP/IP and OSI Reference model. 04
- D Draw 802.3 MAC Ethernet frame format indicating size of each field. 06
- Why only CSMA/CD protocol is preferred for Ethernet. Justify your answer.

OR

- D Enlist different Multiple access protocols. Show how efficiency of slotted aloha is double than the efficiency of pure aloha. 06

**Q-2 Answer the following** **16**

- A What is the significance of Framing at Data link layer? Decode the bit stream: 011111101110011000000001000000101111110 which is encoded using bit stuffing method. 04
- B 20 stations are contending for the use of shared channel using the bitmap protocol. If all the stations whose addresses are even suddenly become ready at once, show how contention is resolved. 06
- C What is binary exponential back off algorithm and where is it used? 06
- OR
- C Distinguish between 1-persistent, non-persistent and p-persistent CSMA. Consider a CSMA/CD network that transmits data at rate of 100 Mbps over 1 Km cable with no repeaters. If minimum frame size required for this network is 1250 Bytes then what will be the signal speed in the network 06

**Q-3 Answer the following****16**

- A Why Selective Repeat is preferred over Go-back-N flow control policy in data link layer. Justify your answer. Consider a data communication network having 25 Mbps channel bandwidth and Round Trip Time (RTT) for a message is 100 micro seconds. If the frame to be transmitted has 50 bits data. Calculate window size and number of sequence bits for Go-back N ARQ and Selective repeat ARQ. 08
- B An organization has 6 departments and employees of these departments are seated in various floors of the building (Every floor have employees of different departments sitting together). The organization want to create a separate network domain for each department. Draw and justify the design using VLAN. 08

**Q-4 Answer the following****16**

- A Classless Inter-domain Routing (CIDR) receives a packet with address 131.23.151.76. What is the identifier of the output interface on which this packet will be forwarded? The router's routing table has the following entries. Show the method applied to find the identifier. 04

Prefix	Output Interface Identifier
131.16.0.0/12	3
131.28.0.0/14	5
131.19.0.0/16	2
131.22.0.0/15	1

- B Address are available starting from 190.0.0.0/16. Five organization have following request. Organization A requires 510 addresses, B requires 30 addresses, C requires 254 addresses, D requires 6 addresses and E requires 1022 addresses. Show IP address allocation (Subnet mask, First and Last address of each network) such that wastage of address space is minimum. 06
- C Which approaches are used for congestion control at network layer? Explain fast recovery approaches. 06

**OR**

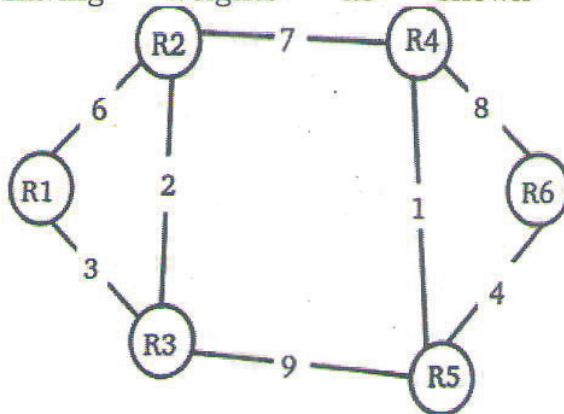
- C If a server host crashes during data transmission phase, how is this crash recovery handled by Transport Layer? Describe with a suitable example. 06

**Q-5 Answer the following****18**

- A What is the use of Token bucket and Leaky bucket algorithm? Describe scenarios where Leaky bucket is preferable and scenarios where Token bucket is preferable. 06



- B How is Connection Establishment done at Transport layer? Explain the significance of each step of connection establishment. 06
- C Consider a network with 6 routers R1 to R6 connected with links having weights as shown in the above figure. 06



All the routers use the distance vector routing algorithm to update their routing tables. After all the routing tables stabilize, What will be the routing table entries at each node and also how many links in the network will never be used for carrying any data?

**Q-6 Answer the following 16**

- A An IP router with a Maximum Transmission Unit (MTU) of 1500 bytes has received an IP packet of size 4404 bytes with an IP header of length 20 bytes. Show values of Fragmentation bit, Data length and offset of every fragment generated. 06
- B How is it possible to send an IPV6 packet from a host in the London office to a host in Paris office (with IPV6 network) via IPV4 network? 06

**OR**

- B Describe necessity and features of Domain name system 06
- C How does NAT help in solving IPv4 address depletion problem? 04