USN ☐☐☐☐☐☐☐☐☐☐

# RV COLLEGE OF ENGINEERING®
**(An Autonomous Institution affiliated to VTU)**
**IV Semester B. E. Grade Improvement Examinations Nov-2020**
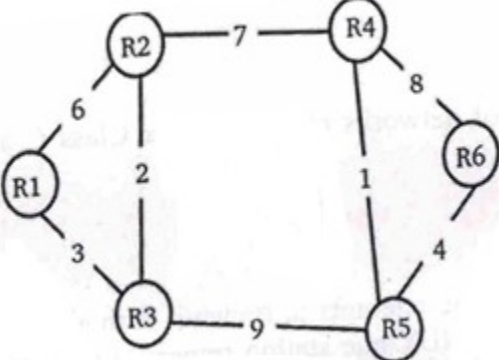## Computer Science and Engineering
# COMPUTER NETWORKS

*Time: 03 Hours*                                          *Maximum Marks: 100*
*Instructions to candidates:*

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

## PART A

| 1 | 1.1 | The data link layer subdivided into two protocol sublayers _____ and _____. | 01 |
|---|---|---|---|
| | 1.2 | Match the following:<br>(P) SMTP — (1) Application layer<br>(Q) BGP — (2) Transport Layer<br>(R) TCP — (3) Data link layer<br>(S) PPP — (4) Network layer<br>(5) Physical layer | 02 |
| | 1.3 | In the $IPV4$ addressing format, the number of networks allowed under class C addresses is _____. | 02 |
| | 1.4 | Define the term Flooding. | 01 |
| | 1.5 | There are n stations in a slotted $LAN$. Each station attempts to transmit with a probability $p$ in each time slot. What is the probability that $ONLY$ one station transmits in a given time slot? | 02 |
| | 1.6 | In _____ routing algorithm each router maintained a table (i.e vector), indexed by, and containing one entry for, each router in the subnet. | 01 |
| | 1.7 | A computer on a 10 $Mbps$ network is regulated by a token bucket. The token bucket is filled at a rate of $2Mbps$. It is initially filled to capacity with 16Megabits. What is the maximum duration for which the computer can transmit at the full $10Mbps$? | 02 |
| | 1.8 | If a class $B$ network on the Internet has a subnet mask of 255.255.248.0, what is the maximum number of hosts per subnet? | 01 |
| | 1.9 | Suppose the round trip propagation delay for a $10Mbps$ Ethernet having 48-bit jamming signal is $46.4\,ms$. The minimum frame size is _____. | 01 |
| | 1.10 | How many bits are allocated for network id ($NID$) and host id ($HID$) in the $IP$ address 25.193.155.233? | 02 |
| | 1.11 | Differentiate between interior gateway protocol, within each $NW$ exterior gateway protocol. | 02 |
| | 1.12 | Consider different activities:<br>m1:Send an email from a mail client to mail server<br>m2:Download an email from mailbox server to a mail client<br>m3:Checking email in a web browser<br>Which is the application level protocol user should use in each activity? | 02 |
| | 1.13 | A stream of packets from a source to a destination is called a _____. | 01 |

## PART B

| | | | |
|---|---|---|---|
| 2 | a | Draw and explain $TCP/IP$ protocol suite in detail. | 08 |
| | b | Suppose the following sequence of bits arrives at the receiver over a link:<br>11010111110101111100010111110110<br>Show the resulting frame after stuffed bits, if any, have been removed. Indicate any errors that might have been introduced into the frame. Defend your answer. | 04 |
| | c | Describe the frame format for Point-to-Point protocol($PPP$) | 04 |
| | | | |
| 3 | a | Differentiate between datagram and virtual circuit subnet. | 08 |
| | b | Consider a network with 6 routers $R1$ to $R6$ connected with links having weights as show in the following diagram. | |



All the routers use the distance vector based routing algorithm to update their routing tables. Each router starts with its routing table in initialized to contain an entry for each neighbor with the weight of the respective connecting link. After all the routing tables stabilize, how many links in the networks will never be used for carrying any data?

| | | | |
|---|---|---|---|
| | | | 04 |
| | c | Compare Link State Routing and Distance vector Routing algorithms. | 04 |

**OR**

| | | | |
|---|---|---|---|
| 4 | a | Demonstrate the working principle of Link State routing with suitable example. | 08 |
| | b | Foe hierarchical routing with 4800 routers, What region and cluster sizes should be chosen to minimize the size of the routing table for a three-layer hierarchy? | 03 |
| | c | Discuss the different ways used to implement Broadcast Routing. | 05 |
| | | | |
| 5 | a | Distinguish between integrated and differentiated services. Describe the scheme of assured forwarding with relevant diagram. | 08 |
| | b | A computer on a $6 - Mbps$ network is regulated by a token bucket. The token bucket is filled at a rate of $1\ Mbps$. It is initially filled to capacity with 8 megabits. How long can the computer transmit at the full $6\ Mbps$? | 03 |
| | c | Discuss the different ways to implement Traffic Throttling. | 05 |

**OR**

| 6 | a | Describe the internetworking happens with tunneling. Mention its advantages and disadvantages. | 08 |
|---|---|---|---|
| | b | Suppose a *TCP* message containing 2048 bytes of data +20 bytes *TCPH* is passed to *IP* for delivery across two networks in *N1* & *n2*<br>*N1*: 14-Bytes Header; *MTU* 1024 bytes<br>*N2*: 8-Bytes Header; *MTU* 512 bytes<br>Give the sizes and offsets of the sequence of fragments delivered to the network layer at the destination host | 08 |
| | | | |
| 7 | a | Consider an application with a server and a number of remote clients. Discuss the different socket primitives for a simple transport service to implement the above application. | 08 |
| | b | Explain in detail the working principle of *RTP* and *RTCP* protocols. | 08 |
| | | | |
| 8 | a | The following is a partial dump of a *TCP* header in hexadecimal format:<br>0532001700000001 00000000 500207*FF* 00000000<br>    i)    What is the source port number?<br>    ii)    What is the application being used?<br>    iii)    What is the sequence number?<br>    iv)    What is the ack number? | 08 |
| | b | Draw and explain in detail the architecture of Electronic mail service? What are the protocols used to implement the different component of Electronic mail service. | 08 |