VI SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

END SEM EXAMINATIONS, MAY 2022

SUBJECT: ADVANCED COMPUTER NETWORKS[CSE 4053]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1.Illustrate with example how IPV6 designer handle following issues
i) When a host in IPv6 joins a network, how it can configure itself ? ii) In IPv6 addressing, there is a specific relation between the hostid (at the IP level) and link-layer address (at the data-link layer) how this is achieved? iii) To allow sites to change the service provider. 5M

2. Compare how following issues handled in IPV6 and IPV4
i) Concept of Flow and Priority ii) Fragmentation and Reassembly 3M

3. An organization is assigned the block 2000:1234:1423/48. What is the CIDR for the blocks in the first and second subnets in this organization? 2M

4. Complex networks today are made up of hundreds and sometimes thousands of components. Proper operation of the network depends on the proper operation of each component individually and in relation to each other. *Fault management* is the area of network management that handles this issue. Give the details of two types of fault management techniques. 4M

5. In a Pastry network using DHT, in which $m = 4$ and $b = 2$, draw the identifier space with four nodes, N02, N11, N20, and N23, and three keys, k00, k12, and k24. Determine which node is responsible for each key. Also show the leaf set and routing table for N11 and N20 node. Assume that the proximity metric between each two nodes is based on numerical closeness. 4M

6. One of the objects (groups) that can be managed is the ***ip*** group with the object identifier (1.3.6.1.2.1.**4**) in which (1.3.6.1.2.1) is the identifier of MIB-2 and (4) defines the ***ip*** group. In an agent, this object has 20 simple variables and three tables. One of the tables is the routing (forwarding) table with the identifier (1.3.6.1.2.1.**4**.**21**). This table has eleven columns, the first of which is called the *ipRouteDes,* which means the destination IP address. Assume that the indexing is based on the first column. Assume the table has four rows at the moment with the destination IP addresses (201.14.67.0), (123.16.0.0), (11.0.0.0), and (0.0.0.0). Show how SNMP can access all four instances of the second column, called *ipRouteIfIndex,* which defines the interface numbers through which the IP should be sent out. 2M

7. Give the LZW encoding steps for a text message in which the alphabet is made of two characters: A and B for a sequence "BAABABBBA". 4M

8.Give the details of Transport-Layer Requirements for Interactive Real-Time Multimedia and then discuss if either UDP or TCP can respond to these requirements. 4M

9. In JPEG using Q10 gives a better compression ratio but a poorer image quality than using Q90 why? 2M

10. One way to improve QoS is to use flow control, which can be achieved using techniques such as scheduling. With example give the details of FIFO queuing and priority queuing techniques. 4M

11. A router uses the token bucket algorithm to regulate the flows. Suppose an incoming flow declares the following parameters for the token bucket algorithm:
Bucket depth b = 5000 tokens.

Average rate r = 1000 tokens per second.
The actual arrival rate of the flow in terms of packets as a function of time is shown in the Fig1 below.
Assume (a) initially the bucket is full and (b) the arrival packet is dropped if there is no token in the bucket,
i) Draw the number of tokens in the bucket as a function of time.
ii) Draw the cumulative number of packets sent out by the router 4M

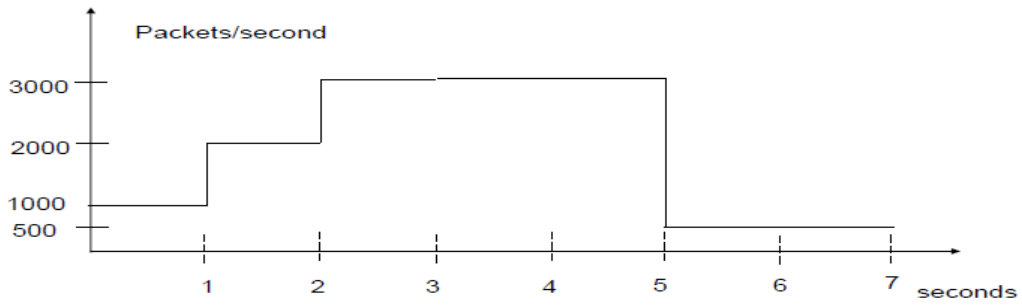

Fig1: Actual arrival rate of the flow in terms of packets as a function of time

12. Distinguish between guaranteed services and controlled-load services in Integrated Services. 2M

13. Give the details of plane separation concept and its impact on SDN devices and controller. 4M

14. With diagram give the details of following SDN implementation.
i) SDN via Device APIs. ii) SDN via Controller APIs 4M

15. Are CDNs important for video streaming and how big is their impact? 2M