BENNETT UNIVERSITY
THE TIMES GROUP

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Department/ School: SCSET

END-TERM EXAMINATION, EVEN SEMESTER MAY 2024

COURSE CODE - CSET207 **MAX. DURATION 2 HRS**

COURSE NAME – Computer Networks

PROGRAM – B.Tech **TOTAL MARKS 40**

Mapping of Questions to Course and Program Outcomes								
Q.No.	A1	A2	A3	A4	B1	B2	B3	B4
CO	1	1,2	1, 3	2,3	1,2	2	2, 3	1, 2
PO	1,2	1,3,7,12	5, 6, 10, 11, 12	3,5,7,10, 11,12	1,3,7,12	1,3	3, 5, 7, 10, 11	4, 5 10, 11
BTL*1	1, 3, 4	1, 2, 4	2, 4	2, 3, 4	2, 3	3, 4	4	2, 3

GENERAL INSTRUCTIONS: -

1. Do not write anything on the question paper except **name, enrolment number** and **department/school.**
2. Carrying mobile phones, smartwatches and any other non-permissible materials in the examination hall is an act of **UFM.**

COURSE INSTRUCTIONS:

a) All the questions are compulsory.

b) Please write precisely and neatly.

c) Please make clear diagram wherever required.

SECTION A **(4Qx5M=20 Marks)**

A1) Imagine a secure messaging application where User A wants to establish a confidential communication channel with User B. Discuss the process involved in calculating the private key and public key value of user A using the provided prime numbers (p and q). What are the key steps and mathematical operations involved in RSA algorithm for the above-mentioned scenario?

[5 Marks]

A2) In Bennett University, the network administrator experiences occasional congestion during peak hours, leading to degraded performance for critical applications. To address this issue, the administrator decides to implement both open-loop and closed-loop congestion control mechanisms. Describe the concepts of open-loop and closed-loop congestion control mechanisms in the context of network

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management. Provide examples of each mechanism and describe how they help mitigate congestion and improve network performance? **[5 Marks]**

A3) Let's consider, you are developing a real-time chat application that requires reliable data transmission over the network. Explain how you would utilize TCP sockets in your application to ensure reliable communication between clients and the server. Describe the key functions or methods you would use in your implementation to establish a TCP connection, send messages, and handle incoming data.

[2+3=5 Marks]

A4) Write down the process of utilizing the CIDR (Classless Inter-Domain Routing) notation to represent the network address and subnet mask of the IPv4 address 192.168.1.25? Additionally, explain the process a network administrator would undertake to reconstruct the complete IPv6 address from the truncated address 0:15::1:12:1213 received from a router, considering an error in transmission. Provide the correct expanded version of the IPv6 address. **[2+3=5 Marks]**

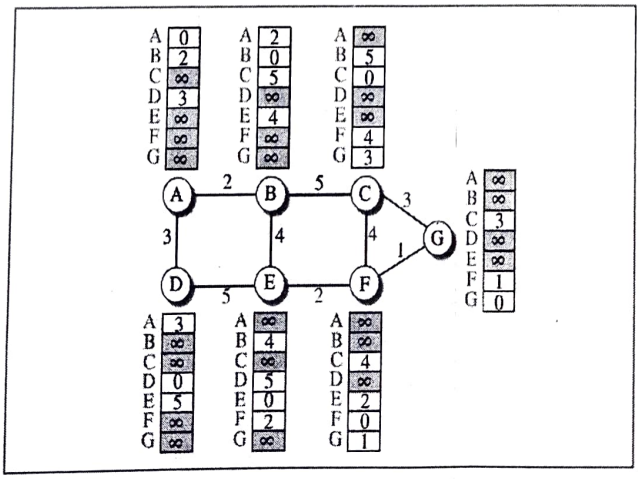
SECTION B

Max Marks: 20

B1) Imagine you are designing a communication system for a university campus where multiple departments need to share a common network infrastructure. Each department has its own set of devices that constantly transmit data frames. In this scenario, let's say there are 1000 frames being produced collectively by all departments per second, with each frame being 200 bits long. The network utilizes a Pure ALOHA protocol, and the shared channel has a bandwidth of 200 kbps. Given this setup, calculate the effective throughput of the network considering these parameters? **[4 Marks]**

B2) Analyse the following network scenario, which includes a distance vector for each node. What would be node B's modified routing table after receiving vectors from directly connected neighbors?

[5 Marks]



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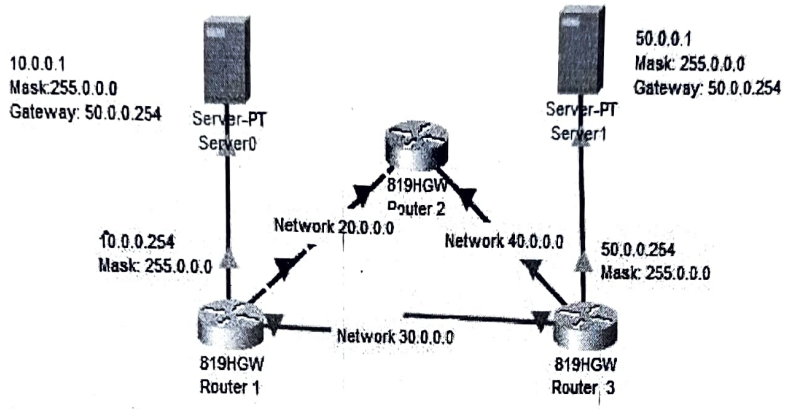
B3) Consider the following topological configurations: **[5 Marks]**




```
Router 1(config)#router ospf 1
Router 1(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router 1(config-router)#network 20.0.0.0 0.0.255.255 area 0
Router 1(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#exit

Router 2(config)#router ospf 1
Router 2(config-router)#network 20.0.0.0 0.255.255.255 area 0
Router 2(config-router)#network 40.0.0.0 0.255.255.255 area 1
Router 2(config-router)#exit

Router 3(config)#router ospf 1
Router 3(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router 3(config-router)#network 40.0.0.0 0.255.255.255 area 0
Router 3(config-router)#network 50.0.0.0 0.255.255.255 area 1
Router 3(config-router)#exit
```

Somehow Server 0 is not able to reach Server 1. What rectifications are required in the above-mentioned topology and router configuration.

B4) Write short notes. Attempt **any three**. **[2+2+2=6 Marks]**

1. POP3 vs IMAP4
2. Domain Name Space
3. TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm
4. Active vs Passive FTP Modes

-ALL THE BEST-