Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India
(Autonomous College Affiliated to University of Mumbai)

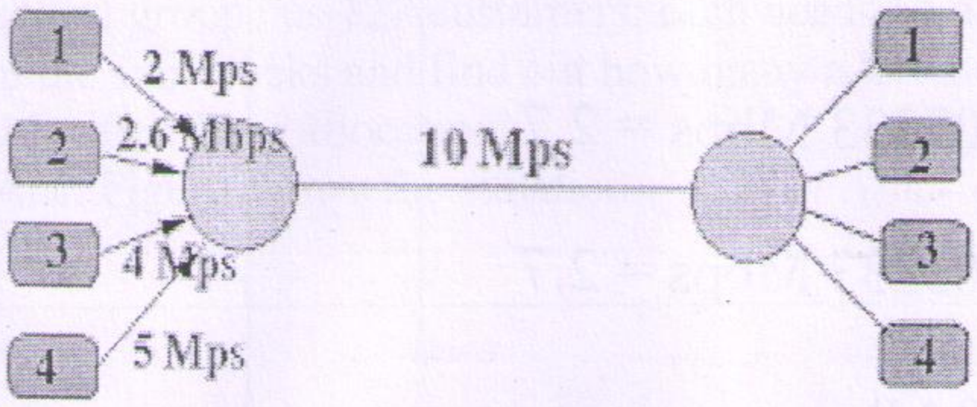
End Semester Examination-Synoptic/Breakup

November 2019

Max. Marks: 60 — Duration: 3 Hrs.
Class: B.E./BTech. — Semester: VII
Course Code:ELE 73B — Branch: ETRX
Name of the Course: Computer and Communication Networks

Instruction:

1) All questions are compulsory
2) Assume suitable data if necessary
3) Figure to the right indicate full mark

Q. No.		Max. Marks	CO-BL-PI
1 a)	Does CSMA/CD work universally in the wired networks? Discuss. Ans: relevant explanation	5	2-3-2.2.4
b)	Identify the cable use to connect the following: 1) PC to PC 2) Router to PC 3) PC serial port to Router console port 4) Floors in Single Building Also compare: 1) Router and Switch 2) HUB and Bridge ANS: 1. Cross through cable… 1mark 2. Cross through cable …1mark 3. Rollover cable…1 mark 4. Multi mode fiber optic cable …1mark 5. Comparison router and switch …3 marks 6. Comparison HUB and Bridge …3 marks	10	1-2-2.1.2
2 a)	Consider the following four flows sharing a common bottle neck link: 	10	2-3-2.2.3

Compute the fair share of each unsatisfied flow using Max-Min Fairness algorithm.

Ans: Iteration1

- compute the fair share of each unsatisfied flow: 10/4 Mbps = 2.5Mbps (per flow)
- Assignment:
- Flow 1: 2 Mbps (with 0.5 Mbps over-assignment)
- Flow 2: 2.5 Mbps
- Flow 3: 2.5 Mbps
- Flow 4: 2.5 Mbps

Unused bandwidth = 0.5 Mbps

The flow with minimum demand (i.e., flow 1 with 2 Mbps demand) has been maximized

Iteration2

- compute the fair share of each unsatisfied flow: 0.5 Mbps = 0.5/3= 0.166Mbps Mbps (per flow)
- Assignment:

Flow 2: 2.5 + 0.1 Mbps = 2.6 Mbps (because demand = 2.6 Mbps)

Flow 3: 2.5 + 0.16666 Mbps = 2.66666 Mbps

Flow 4: 2.5 + 0.16666 Mbps = 2.66666 Mbps

Unused bandwidth = 0.06666 Mbps

Iteration 3

- compute the fair share of each unsatisfied flow:

0.06666 Mbps/2= 0.03333 Mbps (per flow)

- Assignment:

1. Flow 3: 2.66666 + 0.03333 Mbps = 2.7 Mbps
2. Flow 4: 2.66666 + 0.03333 Mbps = 2.7 Mbps

Unused bandwidth = 0.0 Mbps

	OR What is ALOHA? Derive expression for efficiency of pure and slotted Aloha. Ans: definition …2 marks Derivation ….8 marks	10	2-3-2.2.3
b)	Explain bus topology with number of nodes, number of links required, number I/O ports required, advantages and limitations Ans: relevant explanation.	5	1-2-2.1.2
3a)	Explain how Subnet Mask Works? Assume IP Address :192.168.1.1 Now Assume that the administrators requirement is 40 hosts and is using Class C network-id address : 192.168.1.0. Using the concept of Subnetting find the possible of host/subnets and subnet ranges. Ans: Subnet Mask Works example (02 Marks) IP Address :192.168.1.1 Subnet Mask : 255.255.255.0 ANDING PROCESS : 192.168.1.1 = 11000000.10101000.00000001.00000001 255.255.255.0 = 11111111.11111111.11111111.00000000 ========== 192.168.1.0 = 11000000.10101000.00000001.00000000 Class C : N.N.N.H (08 Marks) 110xxxxx.xxxxxxxx.xxxxxxxx.xxxxxxxx Class C : 192.168.1.0 No. of Subnets: 2; No. of hosts: 62/subnets. if you convert 2 host bits to network bits, then customize subnet masks is 255.255.255.192 subnet range: 192.168.1.64 - 192.168.1.191	10	3-3-3.1.6
	OR An ISP is granted a block of addresses starting with 90.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows: a. The first group has 64 customers; each needs 256 addresses. b. The second group has 128 customers; each needs 128 addresses. c. The third group has 128 customers; each needs 64 addresses. Design the sub-blocks and find out how many addresses are still available after these allocations. Ans: Ans: Figure shows the situation.	10	3-3-3.1.6

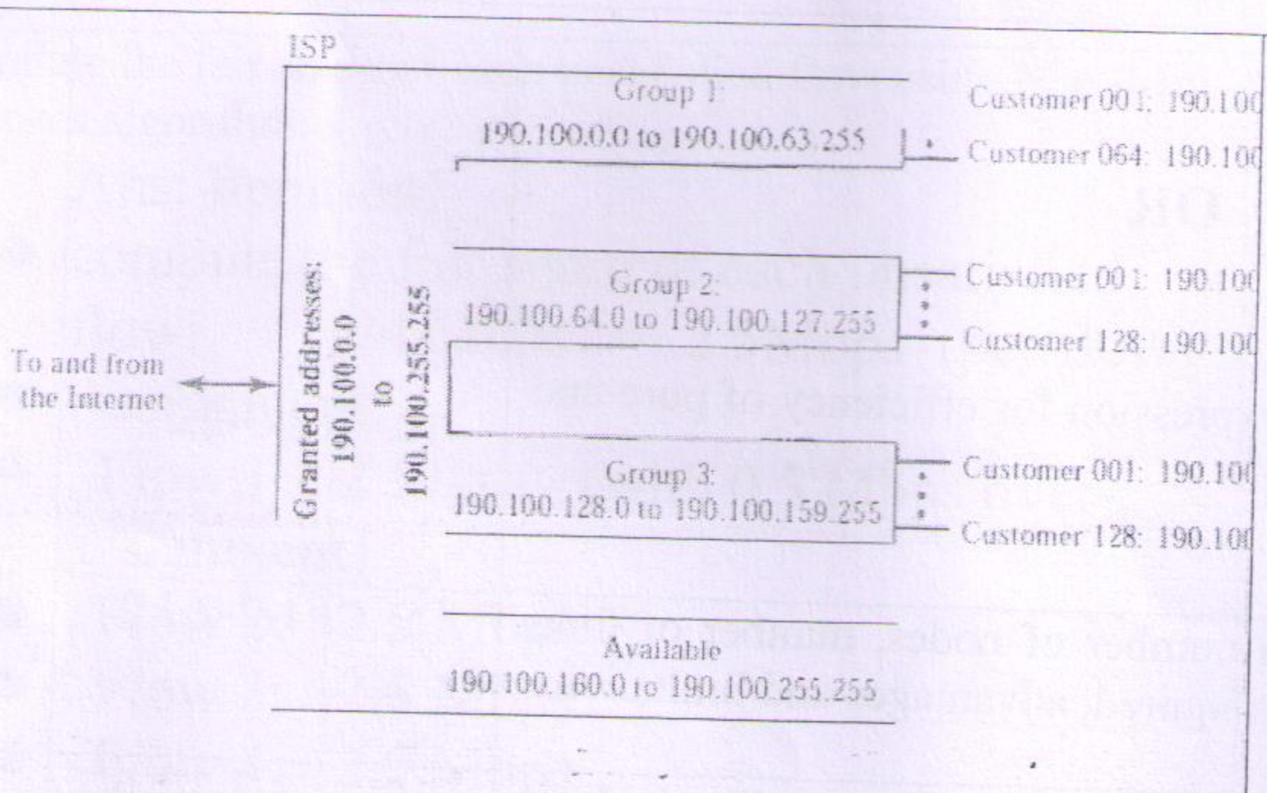


Figure *An example of address allocation and distribution by an IS?*

1. Group 1

For this group, each customer needs 256 addresses. This means that 8 (log2256) bits are

needed to define each host. The prefix length is then 32 - 8 =24. The addresses are

1st Customer:

2nd Customer:

190.100.0.0/24

190.100.1.0/24

190.100.0.255/24

190.100.1.255/24

64th Customer: 190.100.63.0/24 190.100.63.255/24

Total =64 X 256 =16,384

2. Group2

For this group, each customer needs 128 addresses. This means that 7 (10g2 128) bits are needed to define each host. The prefix length is then 32 - 7 =25. The addresses are

1st Customer: 190.100.64.0/25

2nd Customer: 190.100.64.128/25

190.100.64.127/25

190.100.64.255/25

	th Customer: 190.100.127.128/25 190.100.127.255/25 *Total* =128 X 128 = 16,384 **3. Group3** For this group, each customer needs 64 addresses. This means that 6 (logz 64) bits are needed to each host. The prefix length is then 32 - 6 =26. The addresses are *1st Customer:* *2nd Customer:* *190.100.128.0/26* *190.100.128.64/26* *190.100.128.63/26* *190.100.128.127/26* *128th Customer: 190.100.159.192/26 190.100.159.255/26* *Total* =128 X 64 =8192 Number of granted addresses to the ISP: 65,536 Number of allocated addresses by the ISP: 40,960 Number of available addresses: 24,576		
b)	Explain the boot-up process of a typical router with an appropriate flowchart. Ans : flowchart ….2 marks Explanation ..2 marks	5	1-2-2.1.2
4a)	What is NAT? Explain how address translation is done in NAT. Ans: Definition …1 mark Explanation with example…4 marks	5	4-3- 2.2.3
b)	What are the challenges of symmetric key cryptography? Bob wants to send message "HOSPITALITY" to Alice and uses key "Treat" to encrypt the message. Identify relevant Cryptography Algorithm and use the same to perform encryption and decryption. Ans: Challenges …2 marks Use of simple cryptographic algorithm, encryption and decryption …4 marks each **OR**	10	4-3- 2.2.3

	Define the following with example:..2.5 marks each 1) SQL Injection attacks 2) Botnets 3) DoS attacks 4) Replay attacks	10	4-3- 2.2.3