COMSATS University Islamabad, Abbottabad Campus

Department of Computer Science
Mid Term Exam – SPRING-24

Class: BSE-5A & 5B
Date: **16/05/2024**

Subject: **Computer Networks**
Total Time Allowed: **90 minutes**

Name: _____
Total Marks (10 + 35 = ~~45~~) ~~38~~ 37

Section-A

Marks (4+3+3=10)

Question #1 short answers: (CLO-01)

a) Define the role of DASH in a network application? **(4)**
b) Define the CDN networks and its server placement philosophies? **(3)**
c) Define the difference between transport layer and network layer functions? **(3)**

Section-B

Question #2 (CLO-02) **Marks (5+5+5=15)**

You are using a web caches to access/connect to the site www.mysite.com where access link rate 1.64 Mbps and RTT from institutional router to server 2 second. The returned webpage contains some objects with size 100K bits, average request rate from browsers to origin server 15/sec, and local network link rate 1Gbps.

i) 100 kbit x 15/sec ⇒ 1500 kbits/sec ⇒ 1.5 Mbps
ii) 1.50 Mbps / 1 Gbps ⇒ 0.0015 ~~⇒ 0.00075 Gbps~~
iii) 1.50/1.64 ⇒ 0.91 Mbps.

i. Computer the average data rate?
ii. Compute the LAN utilization?
iii. Compute the access link utilization?

Question #3 (CLO-02) **Marks (4+3+8=15)**

a) UDP and TCP use 1s complement for their checksums. Consider you have the two 16 bit words: 1100111000111011 & 1011000111110011.

1100111000111011
1011000111110011
1 0111 1111 0011 1010
1
add (7)

i. Define the basic functionality of UDP check sum? **(3)**
ii. Compute the check sum? (show all work) **(4)**

b) Compute the ***default mask***, ***subnet mask***, ***first address*** and ***last address*** of a network with IP Address 192.16.0.0/12. **(8)**

255.255.255.0
0111 1100 1101 0111
checksum → 1000 0011 0010 1000
1s comp

Question #4 (CLO-03) **Marks (5)**

Examine the user utilization in reliable transfer (rdt 3.0) protocol, when 2Gbps link, 8000 bit packet and propagation delay is 15 ms? **(5)**

$U_{sender} = \frac{L/R}{RTT + L/R}$

$= \frac{16 \times 10^6}{30 \times 10^3 + 16 \times 10^6}$

$= 16 \times 10^6 \times 16 \times 10^{-6}$

$= 16 \times 10^{-6}$

$\frac{16}{30 \times 10^3}$

0.30 sec

CamScanner