5202000100

Indian Institute of Information Technology, Sri City, Chittoor

Name of the Exam: Computer and Communication Networks (CCN)

Duration: 90 mins   Max. Marks: 30 Marks

Instructions:

1. Closed book exam
2. Assumptions made should be clearly stated
3. All sub-parts of the question should be written together
4. Calculators are allowed

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1. Consider the data unit to be transmitted via UDP is –   (3 marks)

   100110011110001000100100100001001001100111100010001001001000100

   a. Calculate the checksum that sender will compute and insert in the UDP's checksum field, and
   b. Prove that the receiver received the data correctly.

2. The protocol data unit(PDU) for the application layer in the Internet stack is: (1 mark)
   a. Segment (trans)
   b. Datagram (Network)
   c. Message (app)
   d. Frame (Link)

3. Consider different activities related to email.   (1 mark)
   m1: Send an email from a mail client to mail server
   m2: Download an email from mailbox server to a mail client
   m3: Checking email in a web browser

   a. m1: HTTP, m2: SMTP, m3: POP
   b. m1: SMTP, m2: FTP, m3: HTTP
   c. m1: SMTP, m2: POP, m3: HTTP
   d. m1: POP, m2: SMTP, m3: IMAP

4. Compare client-server architectures with peer-to-peer architectures using the file distribution problem.
   Note : **File distribution problem:** Time required to distribute file (size F) from one server to N peers [6M]

5. Consider an HTTP client that wants to retrieve a Web document at a given www.iiits..ac.in/std.html The IP address of the HTTP server is initially unknown. List

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out the possible protocols used in transport and application-layer in this scenario? [2M]

6. A Web page HTML file references 15 objects on the same server. The round trip time is 10s and Neglecting transmission time of the file, how much time elapses with
    a. Non-persistent HTTP to access referenced objects?
    b. Persistent HTTP to access referenced objects? (3)

7. HTTP client sent the request message to get the index.file from the server. The Request message is shown below. [2M]

```
GET /~cs3214/index.html HTTP/1.1
Host: www.cs.vt.edu
User-agent: Lynx/2.8.4rel.1
Connection: close
Accept-language: en, fr
```

Identify whether the above HTTP client connection is persistence or non persistence using request messages and justify your answer.

8. Six channels , two (channel-1 & 2) with a bit rate of 100kbps, two (channel-3 & 4) with a bit rate 150 kbps and last two (channel-5 & 6) with a bit rate 200 kbps are to be multiplexed using multiple slots TDM with no synchronization bits. Answer the following questions: assume 4 bits from the first 2 sources and 3 bits from the second 2 sources and 4 bits from the third 2 sources. [4M]

    i. What is the size of a frame in bits?
    ii. What is the frame rate?
    iii. What is the duration of a frame?
    iv. What is the date rate?

9. Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates R1 = 500 kbps, R2= 2 Mbps, and R3= 1 Mbps. [3M]
    a. Assuming no other traffic in the network, what is the throughput for the file transfer?
    b. Suppose the file is 4 million bytes. Dividing the file size by the throughput, roughly how long will it take to transfer the file to Host B

10. Explain SMTP protocol with a diagram. Justify your answer why SMTP cannot be used instead of POP3/IMAP or HTTP aligning your explanation with the below example diagram [5M]