Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2015

Subject Code: 2140709 **Date:28/05/2015**

Subject Name: COMPUTER NETWORKS

Time: 10:30am-1.00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain following terms: **08**

1) Processing Delay
2) Queuing Delay
3) Transmission Delay
4) Propagation Delay

(b) Consider the following HTTP message and answer the following questions: **06**

```
GET /cs453/index.html HTTP/1.1<cr><lf>Host: gai
a.cs.umass.edu<cr><lf>User-Agent: Mozilla/5.0 (
Windows;U; Windows NT 5.1; en-US; rv:1.7.2) Gec
ko/20040804 Netscape/7.2 (ax) <cr><lf>Accept:ex
t/xml, application/xml, application/xhtml+xml, text
/html;q=0.9, text/plain;q=0.8,image/png,*/*;q=0.5
<cr><lf>Accept-Language: en-us,en;q=0.5<cr><lf>Accept-
Encoding: zip,deflate<cr><lf>Accept-Charset: ISO
-8859-1,utf-8;q=0.7,*;q=0.7<cr><lf>Keep-Alive: 300<cr>
<lf>Connection:keep-alive<cr><lf><cr><lf>
```

1) Does browser request a non-persistent or a persistent connection?
2) Which is the (complete) URL of the document requested by the user?
3) Which HTML method is used to retrieve the requested URL?

Q.2 **(a)** Draw the layered architecture of OSI reference model and write the at least two services provided by each layer of the model. **06**

(b) Why distributed database design is more preferred over centralized design to implement DNS in the Internet? Justify. Also explain the way of DNS servers to handle the recursive DNS query using suitable diagram. **08**

OR

(b) Explain the working of electronic mail protocols SMTP, IMAP and POP3 in brief with suitable diagram. **08**

Q.3 **(a)** What do you mean by congestion and overflow? Explain the slow-start component of the TCP congestion-control algorithm. **07**

(b) What is the main difference between forwarding and routing? Explain at least two forwarding techniques used by the router to switching to packets from input port to output port of the router. **07**

OR

Q.3 **(a)** Explain the TCP Segment structure and justify the importance of its field values. **07**

(b) Explain IPv4 datagram format and importance of each filed. **07**

Q.4	**(a)**	How pipeline approach improves the overall sender utilization time? Explain Go-Back-N pipeline approach in transport layer.	**06**
	(b)	Consider sending real-time voice from Host A to Host B over a packet-switched network (VoIP). Host A converts analog voice to a digital 64 kbps bit stream on the fly. Host A then groups the bits into 56-byte packets. There is one link between Hosts A and B; its Transmission rate is 2Mbps and its propagation delay is 10 msec. As soon as Host A gathers a packet, it sends it to Host B. As soon as Host B receives an entire packet, it converts the packet's bits to an analog signal. How much time elapses from the time a bit is created (from the original analog signal at Host A) until the bit is decoded (as part of the analog signal at Host B)?	**04**
	(c)	Consider a router that interconnects three subnets: Subnet 1, Subnet 2, and Subnet 3. Suppose all of the interfaces in each of these three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support at least 60 interfaces, Subnet 2 is to support at least 90 interfaces, and Subnet 3 is to support at least 12 interfaces. Provide three network addresses (of the form a.b.c.d/x) that satisfy these constraints.	**04**

OR

Q.4	**(a)**	How many packets overhead while doing the data communication using TCP? Draw the TCP connection establishment and termination process with diagram.	**06**
	(b)	Suppose a process in Host C has a UDP socket with port number 6789. Suppose both Host A and Host B each send a UDP segment to Host C with destination port number 6789. Will both of these segments be directed to the same socket at Host C? If so, how will the process at Host C know that these two segments originated from two different hosts?	**04**
	(c)	Suppose datagrams are limited to 1,500 bytes (including header) between source Host A and destination Host B. Assuming a 20-byte IP header, how many datagrams would be required to send an MP3 consisting of 5 million bytes? Explain how you computed your answer.	**04**
Q.5	**(a)**	Explain the Link-State (LS) routing algorithm.	**07**
	(b)	Explain slotted ALOHA channel access technique.	**07**

OR

Q.5	**(a)**	Explain Distance-Vector (DV) routing algorithm.	**07**
	(b)	Explain ARP and justify why ARP query sent within a broadcast frame and ARP response sent within a frame with specific destination MAC address?	**07**

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