



K.S. INSTITUTE OF TECHNOLOGY, BANGALORE - 560109
I SESSIONAL TEST QUESTION PAPER 2019 – 20 ODD SEMESTER

SET – A/B

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Degree : B.E
Branch : Computer Science & Engineering
Course Title : Computer Networks
Duration : 90 Minutes

Semester : V
Course Code : 17CS52
Date : 11-Sep-2019
Max Marks : 30

Note:

1. Answer ONE full question from each part.
2. This is an open book exam. Any printed material, handwritten notes etc. is allowed.
3. Sharing of books, notes, printed material is not permitted.
4. Use of calculator is permitted, but no other electronic gadget is permitted.

Q No.	Question	Marks	CO mapping	K-Level
PART-A				
1(a)	Assume that your college network permits only outgoing traffic to port 80 (web) and port 21 (FTP). On your college website (www.ksit.edu.in), there is student registration form (of size 2KB) to be downloaded (which does not require any authentication) by each student. It can be downloaded either using HTTP or using FTP. HTTP protocol has headers overhead of 1500 bytes (500 bytes of request header and 1000 bytes of response header) where as FTP protocol has overhead of only 200 bytes (100 bytes of request and 100 bytes of response). As a student you can select either HTTP or FTP to download this form. Which protocol you would select and explain why.	5	CO1	Applying
(b)	Consider that an underlying communication network guarantees following properties: a) In order delivery, b) Error free (no packet corruption) delivery c) Loss free delivery (No packet loss occurs) i. A transport layer communication protocol uses RDT 1.0 protocol to provide reliable communication. Identify the flaw of using RDT 1.0 with this network. ii. Design the protocol RDT 1.1 enhancing RDT 1.0 to provide reliable communication	5	CO2	Analyzing
(c)	Suppose that users share a common 4 Mbps link. Also, suppose that each user transmits only 25% of the time, but when transmits data, transmits continuously at the rate of 1Mbps. Given this network setup, calculate the following: i. When circuit switching is used, how many users can be supported. ii. Suppose there are total of 5 users using this network using packet switching. Determine the probability that there will be no queuing?	5	CO4	Analyzing

OR				
2(a)	<p>Suppose you are using POP3 to download the emails to your desktop (client) from a mail server using username as CSE and password as KSIT. Consider that before starting the session, your mailbox on the server has 3 emails (from sender S1, S2 and S3). A client interacts with the server using POP3 to retrieve the emails as follows:</p> <ol style="list-style-type: none"> In the first session, client retrieves 1st and 3rd email and deletes the last one. Construct the protocol communication (commands) in proper sequential order to achieve the session activities. Before 2nd POP3 session starts, 3 new emails (from sender S2, S3, and S4) have been added to the mailbox on the server. In the second session, user delete first email, and then retrieve first 3 emails. Construct the protocol communication (commands) in proper sequential order to achieve the session activities, and identify the sender from which emails will be seen by the user. 	5	C01	Applying
(b)	<p>Consider the case of a network where underlying network channel does not corrupt the packet, does not provide out of order delivery, does not replicate packets, but loses every 3rd packet (in each direction). For example, if A sends 3 packets to B, 3rd packet transmission from A to B will be lost and 3rd ack from B to A will be lost. You have been asked to design a reliable transport communication on this network channel (you only know that network may lose some packets). An application uses your reliable transport protocol to transmit 5 packets. Establish the timeline sequence diagrams demonstrating reliable delivery of 5 packets.</p>	5	C02	Analyzing
(c)	<p>The web server of KSIT displays a logo, stored in a image file <code>ksitlogo.png</code> created on 19-Aug-2019. The web development team created a new logo on 05-Sep-2019 and deployed it on the webserver on Sep 06, 2019. A student has accessed the web page and on Sep 07, 2019 and the browser has cached this logo with expiry period of 1 year. The web admin found some faults with the new logo on Sep 08, 2019 and restored the old logo having creation date of 19-Aug-2019.</p> <p>When the same student accessed KSIT website on Sep 09, 2019, browser still displayed the new logo (faulty) and not the old one. As a web expert, you need to dissect the issue and solve it. Explain your approach.</p>	5	C04	Analyzing
PART-B				
3(a)	<p>For a web request, given below are request and response headers.</p> <p><u>Request headers</u></p> <pre>GET /cse_dept.html HTTP/1.1 Host: www.ksit.ac.in Connection: keep-alive Upgrade-Insecure-Requests: 1 DNT: 1 User-Agent: Mozilla/5.0 (Macintosh; Intel Mac</pre>	5	C01	Applying

	<p>OS X 10_14_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 Accept: text/html,application/xhtml+xml, application/xml; q=0.9, image/webp,image/apng,*/* Referer: http://www.ksit.ac.in/ Accept-Encoding: gzip, deflate Accept-Language: en-US,en;q=0.9,hi;q=0.8</p> <p>Response Headers HTTP/1.1 200 OK Server: nginx/1.10.3 (Ubuntu) Date: Thu, 05 Sep 2019 16:55:26 GMT Content-Type: text/html; charset=iso-8859-1 Transfer-Encoding: chunked Connection: keep-alive X-Content-Type-Options: nosniff X-XSS-Protection: 1; mode=block Cache-Control: no-cache, no-store, max-age=0, must-revalidate Pragma: no-cache Expires: 0 X-Frame-Options: DENY Content-Language: en-US Content-Encoding: gzip</p> <p>Examine these headers and answer the following</p> <ol style="list-style-type: none"> Identify the URL request made by the browser Determine if this web page was accessed by typing the URL or by clicking on a link on an existing web page. Identify if the content of this web page is cached by the browser and if yes, for how long Identify the operating system of the machine where web server is running As there is no Content-Length header field in the response, when and how does browser determine that content has been fully received 			
(b)	<p>Consider 3 systems A, B and C with their IP addresses respectively configured as 144.160.176.129, 144.160.176.140, and 144.160.176.158. Your network teacher has asked you to design subnet scheme such that A can communicate with both B and C, but B and C can not communicate with each other. Explain the working your subnetting scheme.</p>	5	CO3	Applying
(c)	<p>Consider that AICTE India is witnessing high traffic for their website www.aicte-india.org. To provide a better user experience, it has deployed the web servers in each of the 28 states of India, and wants a design a mechanism by which client browsers should be served contents from the web server of the respective state from where request is made. All browsers access the main URL i.e. http://www.aicte-india.org to visit the website.</p>	5	CO4	Analyzing

	<p>As an IT admin of AICTE, your job is to develop a mechanism to achieve this objective with following approaches.</p> <ol style="list-style-type: none"> Using features of HTTP protocol Using features of DNS protocol Compare the above two mechanisms w.r.t. performance i.e. which one is expected to provide better user experience 			
OR				
4(a)	<p>Consider that your IT team has created two dynamic web pages <code>hello1.cgi</code> and <code>hello2.cgi</code> and deployed these on the web server. A user accesses these two web pages and first one is displayed with a properly formatted output like below</p> <p>Hello</p> <p>The second web page <code>hello2.cgi</code> is displayed on the browser window as raw content as given below (though IT team expected that it should be displayed with formatted output similar to that of first web page <code>hello1.cgi</code>)</p> <pre><html> Hello </html></pre> <p>The IT team is unable to diagnose the issue. As an HTTP protocol expert, how would you identify the problem and solve it.</p>	5	CO1	Applying
(b)	<p>Consider that your IT friend has just learnt IP addressing and subnetting and configured two machines A and B with their respective IP addresses as 145.161.180.193/20 and 145.161.200.193/20. Your friend claims that both belongs to same subnet but complains that two machines are not able to communicate with each. Using your network knowledge expertise, examine these network addresses and subnet masks, and</p> <ol style="list-style-type: none"> Identify flaws in the network addressing scheme. Develop the subnet scheme (without changing the IP Addresses) such that two machines can communicate. Ensure to design minimum possible subnet size. 	5	CO3	Applying
(c)	<p>Consider a modified (described below) version of RDT 3.0 protocol where underlying network can corrupt as well as lose the packets. Consider that link bandwidth is 100Mbps and has propagation delay of 10ms. Each transmitted packet size is 1250 bytes.</p> <p>The modified version of RDT 3.0 allows two packets to be transmitted in a continuous manner i.e. 2nd packet can be transmitted without waiting for the ack of first packet. Calculate the utilization efficiency of modified RDT 3.0.</p>	5	CO4	Analyzing

Signature of course in charge

Signature of Module Coordinator

Signature of HOD

Signature of Principal