This question paper contains 4+2 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : 50

Unique Paper Code : 32341303 I

Name of the Paper : Computer Networks

Name of the Course : B.Sc. (Hons.) Computer Science

Semester : III

Duration : 3 Hours Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory.

Attempt any *four* questions from Question Nos. 2 to 7.

1. (*a*) Describe how piggybacking is used in the sliding window protocol ? 2

(*b*) How is ARP different from RARP ? 2

(*c*) Write the standard port numbers used by the following protocols : 2

(*i*) HTTP

(*ii*) TELNET

(*iii*) FTP

(*iv*) SMTP.

P.T.O.

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(*d*) Let the data rate of 128 QAM signal be 14Kbps. Find the maximum bandwidth required to transmit this signal. 3

(*e*) Explain all the six flag bits used in the TCP segment Header. 3

(*f*) The following character encoding is used in a data link protocol : 3

A : 10110110; B : 10101110; FLAG : 01111110; ESC : 11100000 show the bit sequence transmitted (in binary) for the four character frame : A B ESC FLAG when each of the following framing methods are used :

(*i*) Character count,

(*ii*) Flag bytes with byte stuffing,

(*iii*) Starting and ending flag bytes, with bit stuffing.

(*g*) Describe various components of a URL. 3

(*h*) Explain the TCP connection termination process. 3

(*i*) Which layer(s) in the OSI model, performs the following services ? 3

(*i*) Process to Process Communication

(*ii*) Synchronization

(*iii*) Encryption and Decryption

(*iv*) Mail Services

(*v*) Node to Node Communication

(*vi*) Access Control.

(*j*) Draw the pulse diagram for the bit stream 110011000011 using the following encoding techniques : 5

(*i*) Manchester encoding

(*ii*) Differential Manchester encoding,

(*iii*) NRZ-I,

(*iv*) AMI

(*v*) HDB3.

(*k*) Distinguish between the following : 6

(*i*) Virtual Circuit Switching and Datagram Packet Switching

(*ii*) Non-Persistent CSMA and P-Persistent CSMA

(*iii*) Time Division Multiplexing and Frequency Division Multiplexing.

P.T.O.

2 (*a*) What is the Binary Exponential Backoff algorithm used in Ethernet ? How does it reduce the probability of collision in the Ethernet ? 4

(*b*) Let an IPV4 datagrams is received with the following field values HLEN = 10, Total Length = 200, Fragment Offset = 100, and MF = 1 :

(*i*) Find the Payload carried by the Datagram.

(*ii*) What is the size of the option field in the header ?

(*iii*) What is the starting and end byte of the payload for the Datagram ? 4

(*c*) What are the periodic signals and why are they commonly used in the analog transmission ? 2

3 (*a*) Explain Distance Vector Routing Algorithm. Also discuss the Count to Infinity problem. 4

(*b*) The network 180.242.0.0/16 has been subdivided into /19 networks : 6

(*i*) How many /19 sub networks are there ? Give their addresses.

(*ii*) How many hosts can be on each network ?

(*iii*) Determine which network the IP address 180.242.108.93 belongs to.

4 (*a*) How does the sliding window protocol handling flow control in the network ? Explain using the Go Back N protocol. 4

(*b*) A receiver receives the vector 11110111001. Using the Hamming code algorithm, find the original code that was sent. 4

(*c*) A digital signal with 8 levels needs to transmit on a noiseless channel. Assuming the channel bandwidth is 100 kHz. Find the maximum data rate of the signal. 2

5 (*a*) What is PPP protocol and its features ? Also give the frame format of PPP. 4

(*b*) Give a brief description of HTTP message headers and their types. 4

(*c*) Define DNS and give *one* example each of absolute domain name and relative domain name. 2

6 (*a*) List *all* the problems that are associated with Remote Procedure Calls. 4

(*b*) Explains *all* the fields of the IP header frame format with the help of a diagram. 4

(*c*) Assume that source S and destination D are connected through three intermediate routers. Determine how many times each packet has to visit the network and data link layer during transmission from S to D. 2

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7 (*a*) A channel has a bit rate of 8Kbps and a propagation delay of 40 ms. For what range of frame sizes, Stop and Wait protocol give an efficiency of at least 50 percent ? 2

(*b*) Why do we need a guard band in Frequency Division Multiplexing ? 2

(*c*) Write short notes on the following (do any *three*) : 6

(*i*) WWW

(*ii*) DHCP

(*iii*) Guided Media

(*iv*) UDP.