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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Seventh Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; February - 2022
Computer Communication Networks

Time: 3 hrs   *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Apply basic mathematics and fundamentals of digital communication to understand concepts of networks.
CO2: Analyse and compare the various algorithms and protocols
CO3: Analyse and characterize computer networks.
CO4: Analyse and optimize the network delay and path for the given specifications
CO5: Identify and illustrate the roles, responsibilities, limitations, and resource fairness in context of computer networks.

<u>*Note:*</u> *I) PART - A is compulsory. **Two** marks for each question.*
*II) PART - B: Answer any <u>Two</u> sub questions (from a, b, c) for Maximum of **18 marks** from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Assume that a system uses five protocol layers. If the application program creates a message of 100 bytes and each layer (including the fifth and the first) adds a header of 10 bytes to the data unit. What is the efficiency (the ratio of application layer bytes to the number of bytes transmitted) of the system?	2	L4	CO2	PO2
b.	Define the following: i) Hashing peer identifier ii) Hashing object identifier	2	L2	CO1	PO1
c.	In TCP, if the value of HLEN is 0111, how many bytes of option are included in the segment?	2	L3	CO5	PO1
d.	List any four services of network layer.	2	L1	CO3	PO2
e.	In a block code, two redundant bits are added to each 8-bit data word. Find the number of valid and invalid codeword's.	2	L4	CO1	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	What are switched networks? With the help of neat block diagrams, explain circuit switching and packet switching networks.	9	L2	CO3	PO2
b.	Explain the layers of TCP/IP protocol suite in detail.	9	L2	CO2	PO2
c.	How compression is achieved in JPEG? Explain in detail.	9	L2	CO2	PO2
	UNIT - II	**18**			
2 a.	With the help of neat diagram, explain how a TCP/IP uses a DNS client and a DNS server to map a host name to an IP address?	9	L2	CO2	PO2
b.	Explain the basic model of FTP.	9	L2	CO2	PO2
c.	Explain the two major classes of P2P networks and also comment on structured and unstructured networks.	9	L4	CO2	PO2

<center>**UNIT - III**</center>   **18**

3 a. The following is a dump of a UDP header in hexadecimal format. 0632000DOO1CE217

  i) What is the source port number?

  ii) What is the destination port number?   9   L4   CO2   PO2

  iii) What is the total length of the user datagram?

  iv) What is the length of the data?

  v) Is the packet directed from a client to a server or vice versa?

  b. Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols?   9   L3   CO2   PO2

  i) Stop-and-Wait   ii) Go-Back-N   iii) Selective-Repeat

  c. With the help of a neat block diagram, explain TCP segment format in detail.   9   L2   CO2   PO2

<center>**UNIT - IV**</center>   **18**

4 a. An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customer as follows:

  i) The first group has 64 customers each needs 256 addresses   9   L4   CO5   PO1
  ii) The second group has 128 customers each needs 128 addresses
  iii) The third group has 128 customer each needs 64 addresses

  Design the sub-blocks and also find the total number of addresses that are still available after these allocations.

  b. An IP$_V$4 datagram has arrived with the following information in the header(in hexadecimal):

  0×45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 OE OF02

  i) Are there any options?

  ii) Is the packet fragmented?   9   L4   CO5   PO1

  iii) What is the size of the data?

  iv) How many more routers can the packet travel to?

  v) What is the identification number of the packet?

  c. Explain the three strategies used to make the transition between IPv4 and IPv6 systems.   9   L2   CO2   PO2

<center>**UNIT - V**</center>   **18**

5 a. A ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput for each of the following cases, if the system (all stations together) produces 1000 frames per second, 500 frames per second and 250 frames per second for a network using: 9   L2   CO5   PO1

  i) Pure ALOHA   ii) Slotted ALOHA

  b. With the help of encoder and decoder diagrams, generate a (5, 4) simple parity check code. List all possible valid code words.   9   L2   CO1   PO1

  c. What is Digital Subscriber Line (DSL)? Explain the concept of ADSL in detail.   9   L2   CO1   PO1

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