SPECIAL SUPPLEMENTARY EXAMINATION-2023
5th Semester B.Tech
COMPUTER NETWORKS
IT 3009
(For 2021 (L.E), 2020 & Previous Admitted Batches)

Time: 3 Hours   Full Marks: 50

Answer any SIX questions.
Question paper consists of four SECTIONS i.e. A, B, C and D.
Section A is compulsory.
Attempt minimum one question each from Sections B, C, D.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable
and all parts of a question should be answered at one place only.

SECTION-A

1.   Answer the following questions. $[1 \times 10]$

(a) Explain the working principle in slotted ALOHA and how it differs from pure ALOHA.

(b) Why transmission delay dominates propagation delay in packet switched networks?

(c) Given the CIDR representation 20.10.30.35 / 27. Find the range of IP Addresses in the CIDR block.

(d) Is port number alone enough to identify a TCP connection. Justify your answer.

(e) What are the components of a HTTP status line and request line of a HTTP message format?

(f) In a sliding window protocol, justify why the optimal sender window size is 1 + 2a.

(g) If transmission delay & propagation delay in a sliding window protocol are 1 msec and 49.5 msec respectively, then what should be the sender window size to get the maximum efficiency?

(h) What is the need of UDP protocol and how it is beneficial than TCP protocol?

(i) In TCP, how many sequence numbers are consumed by SYN+ACK segment?

(j) In TCP protocol, how the 'out of order' packets are handled at receiver end?

SECTION-B

2. (a) Explain various phases of Congestion Control in TCP. What is the significance of congestion window in TCP congestion control? [4]

(b) If WAN link is 2 Mbps and RTT between source and destination is 300 msec, what would be the optimal TCP window size needed to fully utilize the line? [4]

3. (a) Explain how single parity check technique is used to detect errors. Discuss the pros and cons of using this method for error handling. [4]

(b) Explain and compare the benefits and limitations of using cyclic redundancy check method and checksum method with an example. [4]
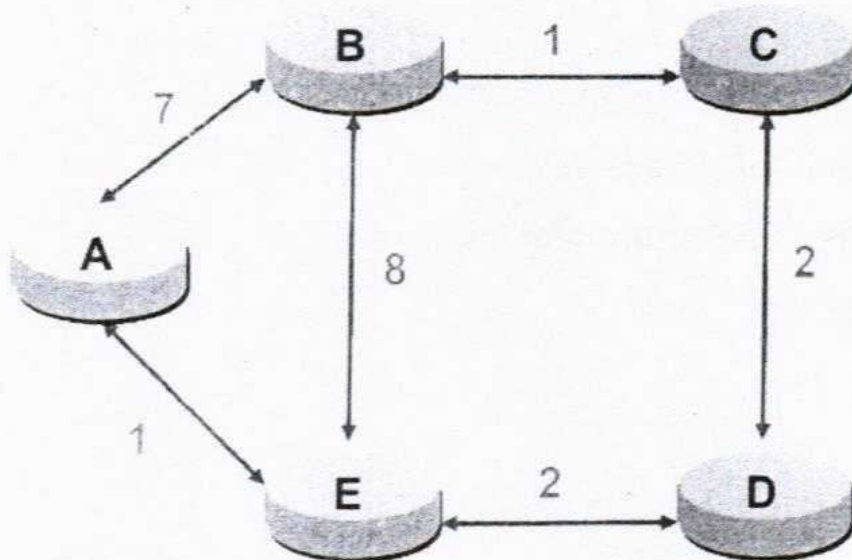
SECTION-C

4. (a) Explain the working principle of CSMA/CD protocol in detecting collision in networks. Why Jam signal and Back off time is used in this protocol. [4]

(b) In a CSMA / CD network running at 1 Gbps over 1 km cable with no repeaters, the signal speed in the cable is 200000 km/sec. What is minimum frame size? [4]

5. (a) Discuss the need of classless addressing in a network and how IP address allocation is more efficient in this method. List out differences between classless and classful addressing. [4]

(b) Explain why IP fragmentation is required. What are the [4]
vital changes made by router during fragmentation?
Explain with an example.

6. (a) Explain distance vector routing protocol with an example. [4]
Discuss the limitations of this protocol.

(b) [4]

Apply distance vector routing in the above network until
convergence. Demonstrate the process.

SECTION-D

7. (a) Explain how packet switching differs from circuit [4]
switching with an example.

Consider all links in the network use TDM with 24 slots
and have a data rate of 1.536 Mbps. Assume that host A
takes 500 msec to establish an end to end circuit with host
B before begin to transmit the file. If the file is 512
kilobytes, then how much time will it take to send the file
from host A to host B?

(b) Elaborate the functionalities of individual layers of OSI [4]
model. Explain why OSI is called a model whereas TCP/IP
is called a stack.

8. (a) Explain with a diagram the Ethernet frame format. [4]
   Consider a 20 Mbps Ethernet LAN that has stations
   attached to a 3.2 km cable. Given that the transmission
   speed is 2.5×10^8 m/sec, the packet size is 128 bytes out of
   which 20 bytes are overhead, find the throughput of the
   network.

   (b) Write short notes on <u>any two</u> of the following: [4]

   i. MAC address vs IP address

   ii. TDMA vs FDMA multiplexing

   iii. IP subnetting

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