(b) An administrator has an IP 192.168.1.0/24 and wants to form subnets for 4(four) departments with the below given details. Design a possible arrangement of subnets to make each department in a different subnet. For each subnet, give subnet mask and range of IP addresses. [4]

Technical → 100 hosts, sales → 50 hosts

Accounts → 25 hosts, HR → 5 hosts

8. (a) Explain why the size of the sender window must be less than 2^m for Go-Back-N ARQ. [4]

(b) Describe how Web caching can reduce the delay in receiving a requested object. Will Web caching reduce the delay for all objects requested by a user or for only some of the objects? Why? [4]

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SUPPLEMENTARY EXAMINATION-2019

3rd Year B.Tech & B.Tech Dual Degree

COMPUTER NETWORKS

IT-3001

[For 2017(L.E), 2016 & Previous Admitted Batches]

Time: 3 Hours Full Marks: 60

Answer any SIX questions.
Question paper consists of four sections-A, B, C, 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. [2 × 10]

(a) Briefly explain how exactly the flow occurs among various layers in OSI model when you are giving any URL address in any browser.

(b) When a station sends a transmission to the MAC address ff:ff:ff:ff:ff:ff, what type of transmission is it?
   A. Unicast
   B. Multicast
   C. Anycast
   D. Broadcast

(c) How performance is improved in CSMA/CD protocol compared to CSMA protocol?

(d) The performance of link state protocol is better than distance vector protocol in a large network. Justify your answer.

(e) If flow control and error control are performed at the data link layer, then why is it also necessary to perform flow and error control at the transport layer?

(f) How does an ARQ system deal with packet loss?

(g) In our reliable data transfer protocol (rdt), why did we need to introduce timers?

(h) Name the header fields of IP, those handles the fragmentation and reassembly of packets.

(i) How throughput is improved in slotted ALOHA over pure ALOHA?

(j) Differentiate between packet switching and circuit switching.

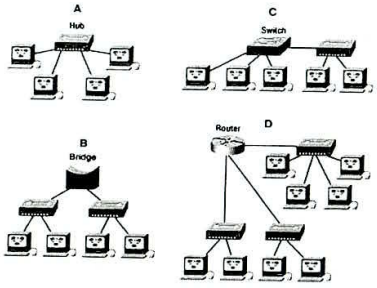
SECTION-B

2. (a) Explain Addressing and Channel access control mechanism for Ethernet LAN. [4]

   (b) List out the advantages and disadvantages of star and ring topology. [4]

3. (a) Explain about different route matrices. [4]

   (b) In the following exhibit, identify the number of collision domains and broadcast domains in each specified device. Each device is represented by a letter:(**A.** Hub **B.** Bridge **C.** Switch **D.** Router) [4]



SECTION-C

4. (a) The distance from earth to a distant planet is approximately 9×10^10 m. What is the channel utilization if a stop-and-wait protocol is used for frame transmission on a 64 Mbps point-to-point link? Assume that the frame size is 32 KB and the speed of light is 3 × 10^8 m/s. [4]

   (b) What do you mean by congestion control and how to detect congestion in a network? Explain the methods involved in TCP slow start to avoid congestion control. [4]

5. (a) Explain in detail how SMTP send your email to your friend's mailbox. [4]

   (b) Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation? [4]

6. (a) How does TCP determine the time-out for implicit detection of packet loss? Be brief. [4]

   (b) Find the code word using hamming code method for the data bits 101011001110. [4]

SECTION-D

7. (a) Explain how CRC is used in detecting errors for the polynomial, g(x)=x^4+x+1. Consider the information sequence 1101011011. [4]

   (i) Find the codeword.

   (ii) If the code word has error in third bit, what does receiver obtain when it does error checking?