| **Duration: 3 hours** | **Max marks: 80** |

Note the following instructions.
1) **Question No.1** is **compulsory.**
2) Total **four** questions need to be solved.
3) Attempt **any three** questions from remaining five questions.
4) Assume suitable data wherever necessary, justify the same.

1.a With an example define the physical address, the internetwork address (IP address), the port address and application specific address. **5**

1.b Explain how H.323 uses G.71/ G.723.1, H.225, Q.931 and H.245 to establish and maintain voice (or video) communication. **5**

1.c Differentiate between subnetting and supernetting. **5**

1.d The following is a dump of a UDP header in hexadecimal format. **5**
CB840035001C001C
i) What is the source port number? ii) What is the destination port number?
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?

2.a Explain the process of sending Email using message transfer agent. **10**
2.b Discuss the DHCP operation when the client and server are on the same network or on different networks. **10**

3.a Explain how TCP controls the congestion in the network using different strategies. **10**

3.b An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows: **10**
  i) The first group has 200 medium-size businesses; each needs approximately 128 addresses.
  ii) The second group has 400 small businesses; each needs approximately 16 addresses.
  iii) The third group has 2000 households; each needs 4 addresses.
Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.

4.a Draw the general format of ICMP messages. Discuss the purpose of error-reporting and query messages. **10**
4.b Explain quality of service (QoS) and how it can be improved using scheduling techniques and traffic shaping techniques. **10**

5.a Discuss some characteristics of real-time audio/video communication. **10**
5.b Draw the IP header format and explain all fields in brief. **10**

6 Write short note on: **20**
a) FTP b) Control field or flags of TCP c) Messages used in RTCP
d) TCP Timers

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