

[Time: 3 Hours]

[Marks:80]

N.B

- (1) Question no. 1 is compulsory.
- (2) Attempt any 3 from the remaining questions.
- (3) Assume suitable data if necessary.
- (4) Figures to right indicate full marks.

- | Q.1 | Attempt any four of the following                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Marks |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| a)  | What is subnetting? Compare subnetting and supernetting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | [5]   |
| b)  | What are three reasons for using layered protocols? What is two possible disadvantages of using layered protocols?                                                                                                                                                                                                                                                                                                                                                                                                                                               | [5]   |
| c)  | Explain the count to infinity problem in detail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | [5]   |
| d)  | List two ways in which the OSI reference model and the TCP/IP reference model are the same. Now list two ways in which they differ.                                                                                                                                                                                                                                                                                                                                                                                                                              | [5]   |
| e)  | 4-bit data bits with binary value 1010 is to be encoded using even parity Hamming code. What is the binary value after encoding?                                                                                                                                                                                                                                                                                                                                                                                                                                 | [5]   |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
| Q.2 | Attempt the following                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |
| a)  | Define guided transmission media? Illustrate with diagram the details for coaxial cable? State any 5 comparative characteristics of coaxial cable with fiber optics and twisted pair cables.                                                                                                                                                                                                                                                                                                                                                                     | [10]  |
| b)  | Explain how collision handled in CSMA/CD? A 5 km long broadcast LAN uses CSMA has $10^7$ bps bandwidth and uses CSMA/CD. The signal travels along the wire at $5 \times 10^8$ m/s. What is the minimum packet size that can be used on this network?                                                                                                                                                                                                                                                                                                             | [10]  |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
| Q.3 | Attempt the following                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |
| a)  | An organization has granted a block of addresses starting with 105.8.71.0/24, organization wanted to distribute this block to 11 subnets as follows <ol style="list-style-type: none"> <li>1. First Group has 3 medium size businesses, each need 16 addresses</li> <li>2. The second Group has 4 medium size businesses, each need 32 addresses.</li> <li>3. The third Group has 4 households, each need 4 addresses. Design the sub blocks and give slash notation for each subblock. Find how many addresses have been left after this allocation.</li> </ol> | [10]  |
| b)  | Explain classful IP addressing scheme in detail? List the advantages and disadvantages of classless IP addressing scheme.                                                                                                                                                                                                                                                                                                                                                                                                                                        | [10]  |

**Q.4 Attempt the following**

- a) Explain the open loop congestion control and closed loop congestion control policies in detail [10]
- b) Explain the TCP connection establishment and Connection release. [10]

**Q.5 Attempt the following**

- a) Explain the concept of sliding protocol? Explain the selective repeat protocol with example? Compare the performance of Selective repeat & Go-back-N protocol. [10]
- b) Explain the link state routing algorithm with example? [10]

**Q.6 Write a short note on following**

- a) ARP & RARP [10]
- b) DNS [10]

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