KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

Marks Scored:

Level : B.E.
Year : III

Course : ETEG 303
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 18 FEB 2025

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices

1. What is the full form of OSI?
   a. optical service implementation
   b. open service Internet
   c. open system interconnection
   d. operating system interface

2. How many layers are there in the ISO OSI reference model?
   a. 7 b. 5 c. 4 d. 6

3. Which one of the following is not a function of network layer?
   a. Congestion control
   b. error control
   c. routing
   d. inter-networking

4. What is the term for an endpoint of an inter-process communication flow across a computer network?
   a. Port b. machine c. socket d. pipe

5. Which layer does the data link layer take packets from and encapsulate them into frames for transmission?
   a. Transport b. application c. Network d. physical

6. Which layer is responsible for process to process delivery in a general network model?
   a. Network b. Transport c. application d. data link

7. The network layer is concerned with _____ of data.
   a. Bits b. frames c. packets d. bytes

8. Which of the following tasks is not done by data link layer?
   a. Framing b. error control c. flow control d. channel coding

9. A device used to connect two different networks is called _____.
   a. Hub b. switch c. modem d. router

10. How many assignable addresses does this combination of IP address and subnet mask have: 172.16.1.0 and 255.255.255.252?
    a. 0 b. 1 c. 30 d. 2

11. Find the broadcast address for a Class B network ID with help of the default subnetmask.
    a. 172. 16. 10.255 b. 255.255.255.255 c. 172.16.255.255 d. 172.255.255.255

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12. I need to create 10 subnets with a Class C network ID, so, _____ subnet mask is used?
a. 255.255.255.252 b. 255.255.255.255 c. 255.255.255.240 d. 255.255.255.248

13. What is the size of IPV6 addressing scheme _____.
a. 32 bit b. 128 bit c. 48 bit d. 64 bit

14. Determine the maximum length of the cable (in km) for transmitting data at a rate of 500 Mbps in an Ethernet LAN with frames of size 10,000 bits. Assume the signal speed in the cable to be 2,00,000 km/s.
a. 1 b. 2 c. 2.5 d. 5

15. Which of the following is true about CSMA/CD.
a. IEEE 802.11 wireless LAN runs CSMA/CD protocol
b. Ethernet is not based on CSMA/CD protocol
c. CSMA/CD is not suitable for a high propagation delay network like satellite network
d. There is no contention in a CSMA/CD network

16. A network with CSMA/CD protocol in the MAC layer is running at 1 Gbps over a 1 km cable with no repeaters. The signal speed in the cable is 2 x 10^8 m/sec. The minimum frame size for this network should be _____
a. 10000 bits b. 3000 bits c. 5000 bits d. 4000 bits

17. Which of the Following Protocol is a Connection-Oriented Protocol?
a. TCP b. UDP c. FTP d. ICMP

18. What is the Primary Function of the Transport Layer?
a. Process to process delivery
b. Node to node delivery
c. Updating and maintenance of routing table
d. Congestion control

19. The transport layer receives data in the form of _____?
a. Byte streams b. datagrams c. packets d. bit streams

20. What is the size of UDP packet header in transport layer?
a. 8 bytes b. 16 bytes c. 20 bytes d. 12 bytes

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Semester : II
F. M. : 40

SECTION "A"
[4 Q. × 10 = 40 marks]

Attempt ANY FOUR questions.

1.

a. Explain the function of Network Layer? Explain the end to-end process of information flow in a communication system. [5]
b. Explain the various methods of flow control techniques in data link layer with an example. [5]

2.

a. A Pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system produces [3]
   i. 1000 frames per second?
   ii. 500 frames per second?
   iii. 250 frames per second?
b. Explain the difference between the TCP and UDP protocols? [3]
c. Figure 1. below consists of two routers R1 and R2. Each router are connected to different organizations through a port. Prepare the forwarding table for both of the routers? [4]

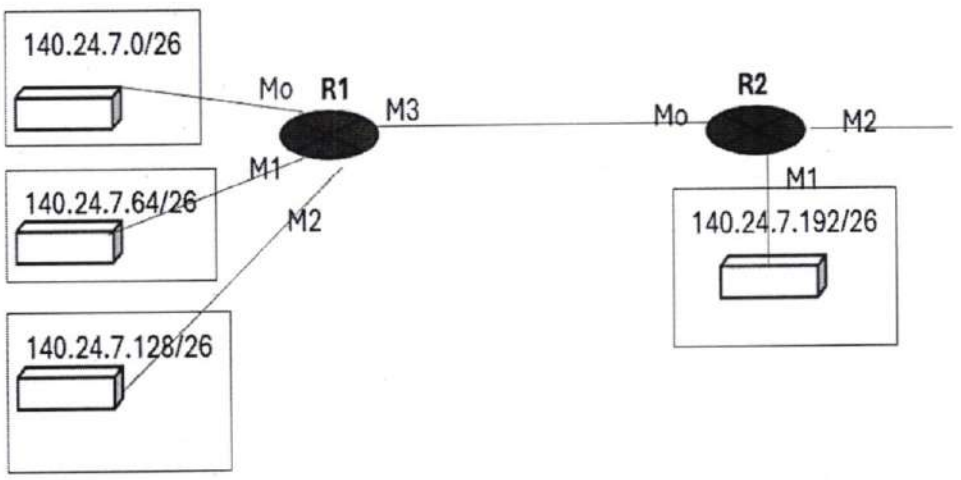

Figure 1.

3.

a. List some of the strategies that are used to avoid collision in CSMA/CA? [5]
b. What do you understand by connection oriented and connectionless protocol. Explain with example? [5]

P.T.O.

4.

a. An ISP is granted a block of 80.70.56.0/21. The ISP needs to allocate addresses for two organizations, each with 500 addresses, two organizations with 250 addresses and three organizations with 50 addresses. [8]
   i. Find the number and range of addresses in the ISP block.
   ii. Find the range of addresses for each organization and the range of unallocated addresses.
   iii. Show the outline of address distribution

b. Four data channels (digital) each transmitting at 1Mbps use a satellite channel of 1 MHz. Design an appropriate configuration using FDM. [2]

5.

a. In the figure 2 consists of nodes with weights assigned, find the shortest path between source **A** to destination **F** using DJkistra's algorithm. [5]

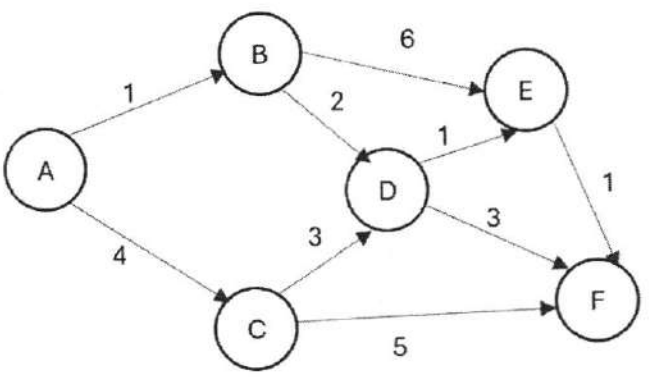

Figure 2.

b. Why in Selective Repeat ARQ the size of sender and receiver window must be at most one half of 2^m ? Here m is the total number of sequence. [5]