



17669



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – MCA-2024

Course Name – Data Communication and Computer Network

Course Code - MCA20110

(Semester II)

Library

Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Select the mode of communication which provide data flow in only one direction.
 - a) Half-duplex
 - b) Full-duplex
 - c) Simplex
 - d) Duplex
- (ii) Choose the number of cable required in mesh topology for n devices in a network and duplex mode transmission facility.
 - a) n^2
 - b) $2n$
 - c) $n(n-1)/2$
 - d) $n(n-1)$
- (iii) Choose which OSI layer has responsibility of encryption .
 - a) Session layer
 - b) Presentation layer
 - c) Datalink layer
 - d) None of these
- (iv) Choose an efficient protocol for networks with high collision rates.
 - a) Pure ALOHA
 - b) CSMA/CD
 - c) CSMA/CA
 - d) Slotted ALOHA
- (v) Identify the role of PPP (Point-to-Point Protocol).
 - a) Converts analog data to digital
 - b) Encrypts wireless data
 - c) Used for direct communication between two network nodes
 - d) Used only for local area networks (LANs)
- (vi) Identify the main function of CSMA/CD in Media Access Control.
 - a) Ensures only one device connects to the network at a time
 - b) Detects and resolves data collisions in wired networks
 - c) Encrypts transmitted data for security
 - d) Manages wireless network bandwidth

- (vii) Identify the primary function of the Internet Control Message Protocol(ICMP) in the TCP/IP model.
- | | |
|----------------------------|----------------------------------|
| a) Data encryption | b) Connection Establishment |
| c) Routing of data packets | d) Error detection and Reporting |
- (viii) Choose the Token Bus operation which is used for collision-free environment.
- | | |
|-------------|------------------|
| a) Ethernet | b) Token Ring |
| c) CSMA/CD | d) None of these |
- (ix) Identify the range of class B IP address as _____.
- | | |
|---------------|---------------|
| a) 127 to 254 | b) 128 to 191 |
| c) 0 to 191 | d) 0 to 128 |
- (x) Use the Process-to-Process communication model in networking.
- | | |
|--------------------|--------------------|
| a) Physical layer | b) Data link layer |
| c) Transport layer | d) Network layer |
- (xi) Choose the best use case for virtual circuit switching.
- | | |
|------------------------------|-----------------------------|
| a) Real-time video streaming | b) On-demand file transfers |
| c) Emergency voice calls | d) SMS messaging |
- (xii) Select why IPv6 uses 128-bit addresses.
- | | |
|-------------------------------------|-------------------------------------|
| a) To increase security | b) To support more devices globally |
| c) To ensure backward compatibility | d) To reduce latency |
- (xiii) Choose the main drawback of symmetric encryption.
- | | |
|--------------------------------------|---------------------------------------|
| a) High computational power | b) Key distribution problem |
| c) Slower than asymmetric encryption | d) Requires multiple keys per session |
- (xiv) Select the main benefit of public-key cryptography.
- | | |
|--------------------------------------|---|
| a) No key exchange is required | b) It is faster than symmetric cryptography |
| c) It does not require a private key | d) It ensures anonymity |
- (xv) Choose which switching method is the best for real-time voice calls.
- | | |
|----------------------|----------------------|
| a) Packet switching | b) Circuit switching |
| c) Message switching | d) Hybrid switching |

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Define the slotted ALOHA. (3)
3. Differentiate between the Hub,Bridge and Router in terms of the ports , connections and security . (3)
4. If the IPv4 address is 192.168.15.12 and the subnet mask is 255.255.255.0, what is the network address? (3)
5. In a network with 100 switches, each switch has a capacity to forward 10,000 packets per second. If the network experiences a packet burst where each switch forwards 100 packets per millisecond. How many packets are forwarded in total by all switches in 1 second? (3)
6. Justify the concept of Subnetting and Supernetting. (3)

OR

Prove the importance of SCTP protocol in congestion control mechanism. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe the structure of a fibre optic cable. (5)
8. Explain the utility of layered network architecture. (5)
9. For n devices, calculate the number of cable links required for a mesh, ring, bus and star topology. (5)
10. Diagram a space division three stage switch . There are 100 inputs and 100 outputs. Stage 1 has five switches, stage 2 has two switches and stage 3 has five switches. (5)
11. If a TCP sender transmits 1000 bytes of data and the window size is 500 bytes. How many packets will be sent? (5)
12. Compare port address and a socket address. (5)

OR

Evaluate the impact of RFID technology on modern network security. (5)

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