BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – BCA-Hons-2024
Course Name – Computer Network
Course Code - BCA20202
(Semester II)

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) In a mesh topology with eight devices, how many cables and ports are required for each device?

   a) 28, 8   b) 34, 67

   c) 28, 7   d) 7, 67

(ii) Which IEEE 802.11 standard is introduced to support 5 GHz frequency band?

   a) 802.11b   b) 802.11g

   c) 802.11n   d) 802.11ac

(iii) A sine wave is offset 1/6 cycle with respect to time 0. What is its phase in degrees and radians?

   a) $\pi/3$ radian   b) 2π radian

   c) $1/\pi$ radian   d) π radian

(iv) Which error detection method does involve both the sender and receiver calculating the sum of transmitted data?

   a) Hamming Code   b) Parity Check

   c) Checksum   d) Bit Stuffing

(v) Interpret the frequency of a periodic signal that completes one cycle in 0.001 seconds.

   a) 1Hz   b) 100Hz

   c) 1KHz   d) 1MHz

(vi) Interpret the mechanism which is used in Ethernet networks to detect and manage collisions.

a) Token Passing

b) Carrier Sense Multiple Access with Collision Detection (CSMA/CD)

c) Virtual Circuit

d) Frame Relay

(vii) Interpret which class does the IP address 130.35.54.12 belong to:

a) Class A

b) Class B

c) Class C

d) Class D

(viii) Apply your knowledge of subnetting to determine the subnet mask for the IP address 192.168.5.20/24.

a) 255.255.0.0

b) 255.255.255.0

c) 255.255.255.128

d) 255.255.255.192

(ix) Identify how the router processes a packet destined for 192.168.1.150 when the best matching route in its routing table is 192.168.1.0/24.

a) Discards the packet

b) Sends the packet to the next hop for 192.168.1.0/24

c) Assigns a new IP address to the packet

d) Broadcasts the packet to all connected devices

(x) Infer the relationship between the Traffic Class field in IPv6 and a corresponding field in IPv4, and outline their roles in packet handling.

a) Fragmentation field

b) Fast switching

c) TOS field

d) Option field

(xi) Interpret the transport layer protocol used when the value in the protocol field is 17.

a) TCP

b) UDP

c) ICMP

d) IGMP

(xii) Apply your knowledge of IP addressing to find the total number of addresses in a Class A block.

a) 2^{16}

b) 2^{24}

c) 2^8

d) 2^{14}

(xiii) Identify the last address of a subnet and illustrate the process used to derive it.

a) 180.8.255.255.

b) 180.8.255.0.

c) 180.12.0.255.

d) 180.0.256.255.

(xiv) Identify the type of protocol which is used to send emails.

a) HTTP

b) FTP

c) SMTP

d) SNMP

(xv) Choose the correct option for the statement, Cryptanalysis is used for -

a) to find some insecurity in a cryptographic scheme

b) to increase the speed

c) to encrypt the data

d) to make new ciphers

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Differentiate between Pure ALOHA and Slotted ALOHA. (3)

3. Convert the following IPV4 addresses from dotted decimal notation to binary notation: a) 111.56.45.78 and b) 221.34.7.82 . (3)

4. A token bucket has a capacity of 8,000 tokens, and tokens arrive at a rate of 500 tokens per (3)
   second. If a packet of 1,500 bytes requires 15 tokens to be transmitted, how many seconds will
   it take to transmit 10 MB of data, assuming the bucket starts full?
5. Analyze the limitations of TCP congestion control in high-bandwidth, long-delay networks. (3)
6. A company has been assigned the IPv4 address block 192.168.1.0/24. It needs to create 4 (3)
   subnets of equal size. Calculate the subnet mask, the number of usable hosts per subnet, and
   the subnet addresses.

OR

Given an IP address 172.16.50.25, determine its class and the default subnet mask. How many (3)
networks and hosts can be created in this class without subnetting?

Group-C
(Long Answer Type Questions)   5 x 6=30

7. Find the SNR of the data set: 1, 4, 7, 8, 10. (5)
8. Given: Bandwidth = 10 Mbps; Average number of frames passed per minute = 12,000; (5)
    Average number of bits carried per frame = 10,000; Find out the Throughput of the network.
9. Define with examples: (a) Signalling Rate (b) Bit Rate (c) Baud Rate. (5)

10. What is the CRC given a 10 bit sequence 1010011110 and a divisor of 1011? (5)
11. A sender wants to transmit the 4-bit data 1011 using Hamming (7,4) code. Calculate the parity (5)
    bits and show the complete transmitted code.
12. Change the following IPv4 addresses from binary notation to dotted-decimal notation: a. (5)
    10000001 00001011 00001011 11101111 b. 11000001 10000011 00011011 11111111 .

OR

Change the following IPv4 addresses from dotted-decimal notation to binary notation: a. (5)
111.56.45.78   b. 221.34.7.82 .

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