KATHMANDU UNIVERSITY
End Semester Examination [C]
November/December, 2023

Marks Scored:

Level : B.E./B.Sc.
Year : II
Course : COMP 204
Semester : II
Exam Roll No. :
Time: 30 mins.
F. M. : 10
Registration No.:
Date 30 NOV 2023

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Mark [X] in the most appropriate option. All symbols have their usual meanings.

1. The IP network 192.168.50.0 is to be divided into 10 equal sized subnets. Which of the following subnet masks can be used for the above requirement?
[ ] 255.255.255.255 [ ] 255.255.255.0 [ ] 255.255.0.0 [ ] 255.255.243.240

2. _____ is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.
[ ] Attenuation [ ] Distortion [ ] Noise [ ] Decibel

3. In Stop and wait protocol every 4th packet is lost and we need to send total 10 packets so how many transmission it took to send all the packets?
[ ] 10 [ ] 11 [ ] 12 [ ] 13

4. A technique called _____ is used to improve the efficiency of the bidirectional protocols.
[ ] parity check [ ] cyclic redundancy check
[ ] checksum [ ] piggybacking

5. The Hamming distance d(11100011, 10011101) is _____
[ ] 4 [ ] 5 [ ] 6 [ ] 7

6. What kind of transmission medium is most appropriate to carry data in a computer network that is exposed to electrical interferences?
[ ] Coaxial cable [ ] Unshielded twisted pair
[ ] Optical fiber [ ] Microwave

7. A single channel is shared by multiple signals by _____
[ ] analog modulation [ ] phase modulation
[ ] digital modulation [ ] multiplexing

8. Devices in a ring topology are usually configured in a _____ relationship.
[ ] primary –secondary [ ] peer-to- peer
[ ] master –slave [ ] multiplexed

9. FTP client contacts FTP server at port_____.
[ ] 20 [ ] 21 [ ] 25 [ ] 80

10. If a periodic signal is decomposed into five sine waves with frequencies of 200, 300, 500, 700, and 800 Hz, what is its bandwidth?
[ ] 200Hz [ ] 300Hz [ ] 500Hz [ ] 600Hz

11. The power of a signal is 10 mW and the power of the noise is 1μW; what is the value of SNR_{dB}?
[ ] 4 [ ] 8 [ ] 10 [ ] 100

12. What is the maximum efficiency of pure ALOHA at G = 0.5?
[ ] 16.4% [ ] 17.4% [ ] 18.4% [ ] 36.8%

13. The message 11001001 is to be transmitted using the CRC polynomial $x^3 + 1$ to protect it from errors. The message that should be transmitted is:
[ ] 11001001000 [ ] 11001001010 [ ] 11001001011 [ ] 11001001001

14. What is the total vulnerable time value of slotted Aloha?
[ ] Tfr [ ] ½ Tfr [ ] 2* Tfr [ ] 4* Tfr

15. For *m* header size, the size of receiver slide window for selective repeat protocol is ____.
[ ] 1 [ ] 2^m [ ] $2^m - 1$ [ ] 2^{m-1}

16. A receiver using stop- and- wait ARQ sends ACK frames numbers _____.
[ ] Sequentially, beginning with 0 [ ] sequentially, beginning with 1
[ ] 0 and 1 only [ ] the frames are not numbered

17. The ability of a single network to span multiple physical networks is known as _____.
[ ] Framing [ ] Masking [ ] Subnetting [ ] Fragmenting

18. Which DNS client maps an address to a name or a name to an address especially when required by a host?
[ ] Primary Server [ ] Secondary Server
[ ] Mapper [ ] Resolver

19. In TCP, if the ACK value is 250, then byte _____ has been received successfully.
[ ] 248 [ ] 249 [ ] 250 [ ] 251

20. Which of the following attacks is threatening availability?
[ ] Replaying [ ] Masquerade [ ] Modification [ ] Denial of service

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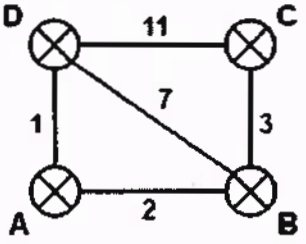
SECTION "B"
[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. List two similarities and two differences between OSI reference model and the TCP/IP reference model. [2+2]

2. Briefly describe the types of Controlled Access protocols.

3. Explain the working mechanism of the Distance Vector routing protocol considering a network with four routers as shown below.



4. Is UDP better than TCP? Explain your answer. Explain TCP three-way handshake process with suitable diagram. [1.5+2.5]

5. Explain about the operation of Carrier Sense Multiple Access with Collision Detection with suitable example.

6. What are the differences between working mechanism of Go-Back-N ARQ and Selective Repeat ARQ? Explain with suitable examples

7. Write short notes on : [2+2]
   a. DNS
   b. Fiber Optics

SECTION "C"
[2 Q. × 8 = 16 Marks]

Attempt *ANY TWO* questions.

8. A large number of consecutive IP addresses are available at 202.70.64.0/19. Suppose that four organizations A, B, C, D request 100, 500, 800 and 400 addresses respectively. How the subnetting can be performed so that address wastage will be minimum? Design the subblocks (i.e finding subnet mask, range, first address, last address, number ip address used in the sub block).

9. a. What are the drawbacks of Parity Check and Checksum approach for error detection? [4]

b. Explain how errors are detected and corrected using Hamming Code H(7,4). [4]

10. a. Describe the types of attacks in network security. [4]

b. Describe row-column transposition cipher with suitable example. [4]