Mark Scored:

KATHMANDU UNIVERSITY
End Semester Examination
August/September, 2017

Level : B. E.
Year : III
Course : ETEG 303
Semester : II
Exam Roll No. :
Time: 30 min
F. M. : 20
Registration No.:
Date : SEP 03 2017

SECTION "A"
[20 Q × 1 = 20 marks]

Encircle the most suitable answer to the following questions:

1) _____ Topology requires a multipoint connection.
a) bus b) star c) mesh d) ring

2) In _____ transmission, the channel capacity is shared by both communication devices at all times.
a) simplex b) half-duplex c) full-duplex d) half-simplex

3) When a host on network A sends a message to a host on network B, the router looks at _____ address?
a) Logical b) physical c) port d) none

4) In the OSI model, encryption and decryption are functions of the _____ layer.
a) application b) presentation c) session d) transport

5) _____ multiplexing technique transmits digital signals?
a) WDM b) FDM c) TDM d) none of the above

6) The word _____ refers to the point of a _____ that carries a transmission.
a) Line; channel b) channel; link c) link; channel d) line; link

7) In _____switching each packet is treated independently of all others.
a) Circuit b) message c) frame d) datagram

8) In _____ switching there is no resource allocation for a packet.
a) circuit b) datagram c)frame d) message

9) Checksum use _____ arithmetic.
a) One's complement
b) two's complement
c) AND
d) XOR

10) To guarantee the detection of up to 5 errors in all cases the minimum Hamming distance in a block code must be ___.
a) 11 b) 5 c) 6 d) 7

11. In PPP, the _____ is responsible for establishing, maintaining, configuring, and terminating links.
a) PAP b) CHAP c) NCP d) LCP

12. In _____, the configuration is balanced. The link is point to point and each station can function as a primary and a secondary.
a) ARM b) ABM c) NBM d) NRM

13. In classless addressing, the size of block N is _____ if the value of prefix length (n) is 24.
a) 64 b) 32 c) 16 d) 256

14. The vulnerable time for CSMA is _____ the propagation time.
a) Three times b) two times c) one times d) none

15. In classless addressing, the prefix length defines the _____.
a) netid b) hostid c) mask d) domain

16. _____ address could be the beginning address of a block of 256 classless addresses.
a) 2.4.6.5 b) 2.4.6.15 c) 2.4.6.0 d) none

17. The number of addresses in a class C block is _____.
a) 65534 b) 16777216 c) 256 d) 1024

18. In classless addressing, the _____ is the varying part.
a) suffix b) prefix c) host id d) network id

19. The _____ layer is responsible for moving frames from one to the next.
a) transport b) data link c) physical d) network

20. The Internetworking Protocol (IP) is a _____ protocol.
a) Unreliable b) connection oriented
c) connection less d) unconnected

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SECTION "B"

Attempt *ANY FIVE* questions. Assume suitable data if necessary. Figure to the right indicate full mark.

1 a. What do you mean by modularity and explain the advantages of protocol layering? [2+2]

b. A system has five protocol layers. If an application layer creates a message of 150 bytes and each layer (including the fifth and first layer) adds a header of 20 bytes to the data unit. What is the efficiency of the system? [3]

c. We have four sources, each creating 250 characters per second. If interleaved unit is a character and 1 synchronizing bit is added to each frame, find (1) the data rate of each source, (2) the duration of each character in each source, (3) the frame rate and (4) the number of bits in each frame. [4]

2 a. How are source and destination link layer addresses determined for each link? Explain with proper figure and examples. [4]

b. Given a data word 101001111 and divisor 10111, show the generation of the CRC code word at the sender site and extraction of message at the receiver side. [3]

c. Explain the procedure to calculate the traditional checksum with example. [4]

3 a. Explain the transition phase of PPP. Which authentication protocol in PPP provides greater security? [2 + 3]

b. Using the following specifications, draw a FSM with three states (I, II and III) five events and six actions. [3]

i. If the machine is in state I, two events occur. If event 1, occurs, the machine moves to state II. If event 2 occurs, the machine performs actions 1 and 2 and moves to state III.

ii. If the machine is in state II, two event occur. If event 3 occurs, the machine remains in state II. If event 4 occurs, the machine moves to state III.

iii. If the machine is in state III, three events can occur. If event 2 occurs, the machine remains in state III. If event 3 occurs, the machine performs actions 1, 2, 4 and 5 moves to state II. If event 5 occurs, the machine performs action 1, 2 and 6 and moves to state I.

c. What is the purpose of NAV in CSMA/CA? [3]

4 a. Prove that maximum throughput of Slotted Aloha $S_{max} = 0.368$, when $G = 1$. A slotted ALOHA network transmits 200-bit frames using a shared channel with a 200-kbps bandwidth. Find the throughput if the system produces. i) 1000 frames per second ii) 500 frames per second. [2+2]

b. Explain why collision is an issue in random access protocols but not in channelization protocols. [3]

c. Do we need a two separate media for a full duplex communication between two nodes? Explain with proper reasoning. [4]

5 a. An ISP is granted with a block of address starting from 190.100.0.0/16. The ISP needs to distribute these address to a group of three customers as follows: [6]

i. The first group has 64 customers; each need 256 addresses.
ii. The second group has 128 customers; each needs 128 addresses.
iii. The third group has 128 customers; each needs 64 addresses.

Design the sub block and give the slash notation for each sub block.

b. How does the load effect the packet delay and throughput of a system in a network? Explain with appropriate figures. [3]

c. What do you mean by classful and classless addressing? [2]

6 a. Explain DHCP process with state diagram. [5]

b. Write short notes on: [6]

i. TCP/IP
ii. NAT
iii. DSSS