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The LNM Institute of Technology, Jaipur
Mid Term Exam Odd Sem (2017-2018)

MM: 50 **Computer Networks** **Time: 1.5 Hours**

PART – A

1. For each of the following four networks, discuss the consequences if a connection fails.
   a) Seven devices arranged in a mesh topology
   Only the communication between two devices will get affected
   b) Seven devices arranged in a star topology (not counting the hub)
   Only the communication between two devices will get affected.
   c) Seven devices arranged in a bus topology
   Communication between all the devices will be disrupted.
   d) Seven devices arranged in a ring topology
   Communication between few devices will get disrupted.

[4*1 Marks]

2. In an internet, assume that the LAN technology is changed to a new one. Which layers in the TCP/IP protocol suite need to be changed?
   Physical layer ~~Applicat~~.

[1 Marks]

3. Match the following to one or more layers of the TCP/IP protocol suite:
   a) route determination: ~~Data link layer~~ Network layer.
   b) connection to transmission media: Physical layer
   c) providing services for the end user: Application layer.

[1.5 Marks]

4. How many IP addresses and how many link-layer addresses should a router have when it is connected to five links?
   2 link layer addres and 5 IP address.

[1 Marks]

5. In CRC, let the chosen generator be 1100101. What is the probability of detecting a burst error of length 10?
   $\frac{1}{2^{10}}$ Since

[2 Marks]

6. In CRC, which of the following generators (divisors) guarantees the detection of an odd number of errors? Why?
   a) 10111 b) 101101 c) 111
   b) can be written as $1+x^2+x^3+x^5 = (1+x^2)(1+x^3) = (1+x)(1+x^2)(1+x^2+x)$
   Since $x+1$ is a factor and we know that $(x+1)$ guarantees the detection of an odd no. of errors.

[4 Marks]

7. For the Stop-and-Wait protocol, state what happens in each of the following cases:
   a) The receiver is in the ready state and a packet comes from the network layer.
   Ack. is sent back.
   b) The receiver is in the ready state and a corrupted frame arrives.
   Frame is discarded and acknowledgement not sent.
   Rn not increased.

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c) The receiver is in the ready state and an acknowledgement arrives.
S_f is incremented. Next packet is sent and then S_n incremented

d) The sender is at the ready state and a corrupted acknowledgement arrives.
Acknowledgement is discarded. And the whole frame is discarded afterward and sent from fresh.

e) The sender is at the ready state and a time-out occurs.
Sender sends the pervious packet again.

f) The sender is at the blocking state and a time-out occurs.
whole frame is sent from fresh.

[6*1 Marks]

8. Answer the following questions realted to Selective-repeat protocol with m = 7 bits.

a) The sending machine is in the ready state with S_f = 10 and S_n = 15. What is the sequence number of next packet to send?
15

b) The sending machine is in the ready state with S_f = 10 and S_n = 15. The timer for packet 10 times out. How many frames are to be resent? What are their sequence numbers?
only packet 10 is resent. One packet has to be ~~resent~~ resent.

c) The sending machine is in the ready state with S_f = 10 and S_n = 15. An ACK with ackNo = 13 arrives. What are the next values of S_f and S_n? What is the action in response to this event? S_n ~~remains~~ remains same.
$S_n = 15$. $S_f = 14$

d) The sending machine is in blocking state with S_f = 14 and S_n = 21. What is the size of the window? Window size = $2^6 = 64$

e) The sending machine is in blocking state with S_f = 14 and S_n = 21. An ACK with ackNo = 14 arrives. Frames 15 and 16 have already been acknowledged. What are the next values of S_f and S_n? What is the state of the sending machine?
$S_f = 17$ $S_n = 21$. Sending machine in ready state.

[5*1.5 Marks]

9. Match the following to the devices:

a) A multiport device, that can be used to serve as the connection point and at the same time function as a repeater. switch.
b) Forwards the packet from all outgoing ports except the one from which thesignal was received. ~~Router~~. Hub.
c) It can check the destination address of a frame and can decide which outgoing port the frame should be sent. Switch.
d) Uses a table that maps addresses to ports. Router.

[1 Marks]