SOLUTION ASSIGNMENT-06 (BCS 5A & 5C)

PART-01

PROBLEMS

Problem 1.

1 1 1 0 1
0 1 1 0 0
1 0 0 1 0
0 1 0 1 0
0 1 0 0 1

Problem 5.

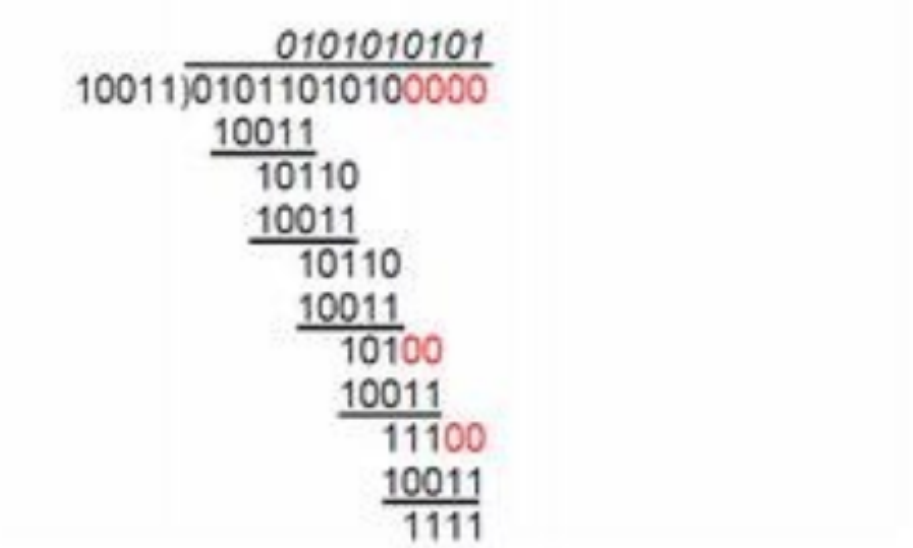
If we divide 10011 into 1010101010 0000, we get 1011011100, with a remainder of R=0100. Note that, G=10011 is CRC-4-ITU standard.

Problem 6.

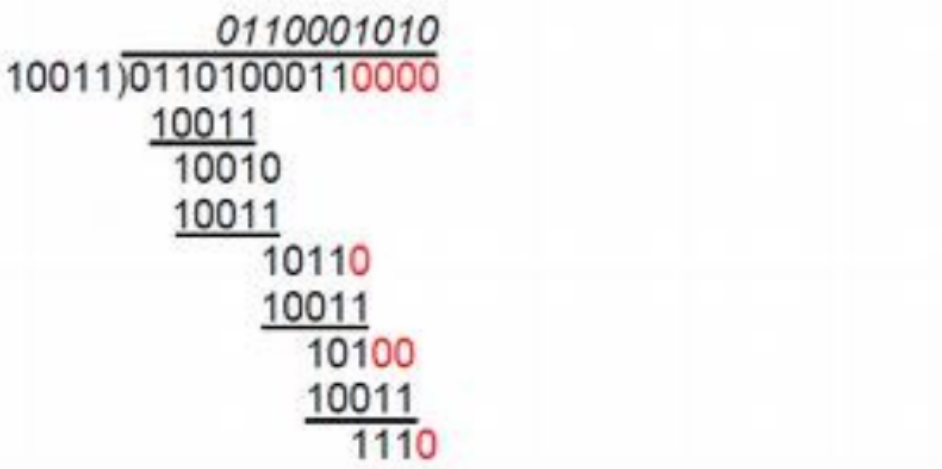
a) we get 1001001000, with a remainder of R=1000.

```
          1001001000
10011)10001001010000
      10011
        10001
        10011
          10010
          10011
             1000
```

b) we get 0101010101, with a remainder of R=1111.

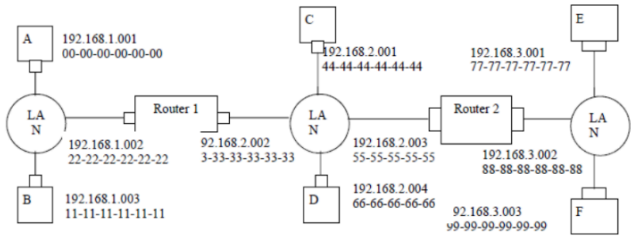


c) we get 0110001010, with a remainder of R=1110.



Problem 14.

a), b) See figure below.



c)

1. Forwarding table in E determines that the datagram should be routed to interface 192.168.3.002.
2. The adapter in E creates and Ethernet packet with Ethernet destination address 88-88-88-88-88-88.
3. Router 2 receives the packet and extracts the datagram. The forwarding table in this router indicates that the datagram is to be routed to 198.162.2.002.
4. Router 2 then sends the Ethernet packet with the destination address of 33-33-33-33-33-33 and source address of 55-55-55-55-55-55 via its interface with IP address of 198.162.2.003.
5. The process continues until the packet has reached Host B.

d) ARP in E must now determine the MAC address of 198.162.3.002. Host E sends out an ARP query packet within a broadcast Ethernet frame. Router 2 receives the query packet and sends to Host E an ARP response packet. This ARP response packet is carried by an Ethernet frame with Ethernet destination address 77-77-77-77-77-77.

Problem 22.

i) from A to switch: Source MAC address: 00-00-00-00-00-00
Destination MAC address: 55-55-55-55-55-55
Source IP: 111.111.111.001
Destination IP: 133.333.333.003

ii) from switch to right router: Source MAC address: 00-00-00-00-00-00
Destination MAC address: 55-55-55-55-55-55
Source IP: 111.111.111.001
Destination IP: 133.333.333.003

iii) from right router to F: Source MAC address: 88-88-88-88-88-88
Destination MAC address: 99-99-99-99-99-99
Source IP: 111.111.111.001
Destination IP: 133.333.333.003

Problem 26.

Action	Switch Table State	Link(s) packet is forwarded to	Explanation
B sends a frame to E	Switch learns interface corresponding to MAC address of B	A, C, D, E, and F	Since switch table is empty, so switch does not know the interface corresponding to MAC address of E
E replies with a frame to B	Switch learns interface corresponding to MAC address of E	B	Since switch already knows interface corresponding to MAC address of B
A sends a frame to B	Switch learns the interface corresponding to MAC address of A	B	Since switch already knows the interface corresponding to MAC address of B
B replies with a frame to A	Switch table state remains the same as before	A	Since switch already knows the interface corresponding to MAC address of A

PART-02

Question 1

Concept:

If the polynomial is of order n then the number bits generated by CRC generator is n + 1.

Data:

Message = $m_4m_3m_2m_1m_0$ = 11000

CRC polynomial = X^3+X+1

Explanation:

CRC polynomial = $1.X^3+ 0.X^2 + 1.X+ 1.X^0 \equiv 1011$

Message bits will be 11000 **000**

Calculation:

Hence 100 will be appended to message bits ($m_4m_3m_2m_1m_0$ = 11000).