# CCN Past Paper 2021

Q1 160.20.10.0 (Class B)

Network 1 = 58

Network 2 = 30

Network 3 = 30

Network addres = ? Broadcast Addres = ?

No. of host = ? Range = ?

Sol:- Performing using VLSM.

Borrow 10 bits

160.20.10.0/26

~~160.20.10.0/26~~

Network bits = 26. Host bit = 6

$2^{10}$ = 2048 (subnets)

$2^6$ = 64 (Range of each subnet)

Subnets:

① 160.20.10.0/26 — 160.20.10.63/26

(Total valid host = 64-2 = 62)

Network address. Broadcast add.

Range = $2^6$ = 64

Network 1 needs 58 ips so use this network.

② 160.20.10.64/26 — 160.20.10.127/26

Network add ↑ Broadcast add ↑

Total valid Host = 64-2 = 62

Futhur subnetting this network.

Range = $2^6$ = 64.

i) 160.20.10.64/27 — 160.20.10.95/27
↳ Network Add. ↳ Broad cast add.

Total valid host = $2^5 - 2 = 32 - 2 = 30$

Network 2 = 30

so Network 2 use this network.

Range = $2^5 = 32$.

ii) 160.20.10.96/27 — 160.20.10.127/27
↳ Network add. ↳ Broadcast add.

Total valid host = $2^5 - 2 = 32 - 2 = 30$

Network 3 = 30

so Network 3 use this network.

Range = $2^5 = 32$

Q3(a)

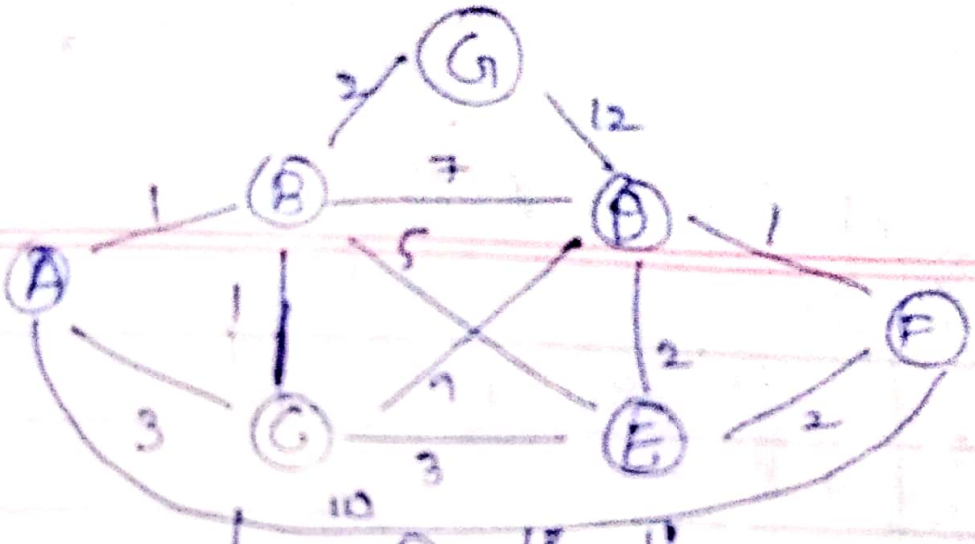
| | |
|---|---|
| 11000 11 | 0 |
| 10101 00 | 1 |
| 00110 11 | 0 |
| 01000 00 | 1 |
| 0001100 | 0 |

3rd MSB changes so,

| | |
|---|---|
| 11001 11 | 0 |
| 10100 00 | 1 |
| 00110 11 | 0 |
| 01010 00 | 1 |
| 0001100 | 0 |

Since error is identified so it will corrected and data will transfer correctly.

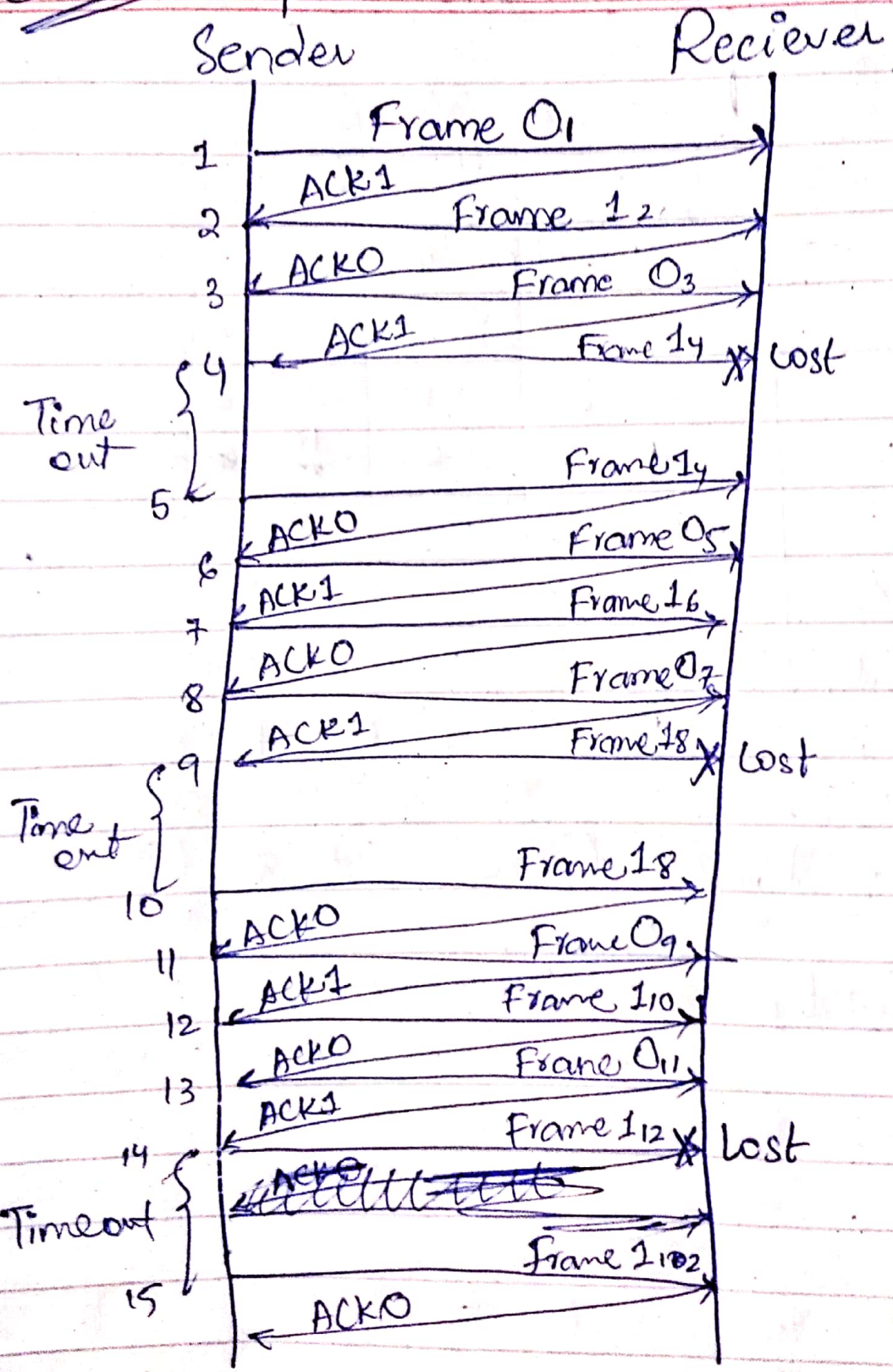
Q1(b)




| Source | Destination | | | | | |
|---|---|---|---|---|---|---|
| | B | C | D | E | F | G |
| A | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ |
| A | 1 | 3 | ∞ | ∞ | 10 | ∞ |
| A,B | 1 | 2 | 8 | 6 | 10 | 3 |
| A,B,C | 1 | 2 | 8 | 5 | 10 | 3 |
| A,B,C,G | 1 | 2 | 8 | 5 | 10 | 3 |
| A,B,C,G,E | 1 | 2 | 7 | 5 | 7 | 3 |
| A,B,C,G,E,D | 1 | 2 | 7 | 5 | 7 | 3 |
| A,B,C,G,E,D,F | 1 | 2 | 7 | 5 | 7 | 3 |

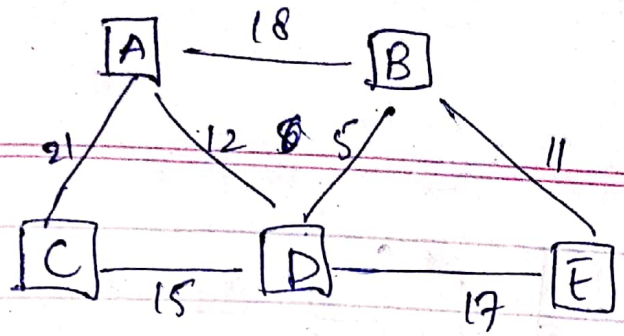
Shortest path= A, B, C, G, E, D, F.

# Q2(a) Stop & Wait ARQ:-




Total transmissions = 15.

Q4(a)




A.

| Dest | Dist | Next |
|---|---|---|
| A | 0 | A |
| B | 18 | B |
| C | 21 | C |
| D | 12 | D |
| E | ∞ | – |

B.

| Dest | Dist | Next |
|---|---|---|
| A | 18 | A |
| B | 0 | B |
| D | 5 | D |
| E | 11 | E |
| C | ∞ | – |

C.

| Dest | Dist | Next Hop |
|---|---|---|
| A | 21 | A |
| B | ∞ | – |
| C | 0 | C |
| D | 15 | D |
| E | ∞ | – |

D.

| Dest | Dist | Next |
|---|---|---|
| A | 12 | A |
| B | 5 | B |
| C | 15 | C |
| D | 0 | D |
| E | 17 | E |

E

| Dest | Dist | Next |
|---|---|---|
| A | ∞ | - |
| B | 11 | B |
| C | ∞ | - |
| D | 17 | D |
| E | 0 | E |

On Router B.

Dist from A is 18

So from Router E to A

E → B → A

Dist = 11 + 18 = 29

On Router D

Dist from A is 12

So from Router E → A

E → D → A

Dist = 17 + 12 = 29

So E (Router) can reach router A via both Router B or Router D. because distance is same.

E → B → A = 29

On Router B :-

Dist from C is ∞

So Router E cannot reach Router C via Router B.

On Router D :-

Dist from C is 15

so Router E to C

$E \rightarrow D \rightarrow C$

Dist = 17 + 15 = 32

so Router E can reach router C via router D.

Routing Table on E :-

E

| Dest | Dist | Next |
|---|---|---|
| A | 29 | B |
| B | 11 | B |
| C | 32 | D |
| D | 17 | D |
| E | 0 | E |

Q3(b) Data = 1001

Data bit = 4

(n, k)

$2^r > k + r$

$2^r > 4 + r$

$2^3 > 4 + 3$

$8 > 7$

$r = 3,\ k = 4,\ n = 4$

Data bit 1001

$k_4 k_3 k_2 k_1$

Redundant bit position

$2^0 = 1$

$2^1 = 2$

$2^2 = 4$

Data transfer

1 0 0 1 1 0 0

$k_4\ k_3\ k_2\ R_3\ k_1\ R_2\ R_1$

$R_1 = k_1 \oplus k_2 \oplus k_4$

$R_1 = 1 \oplus 0 \oplus 1$

$R_1 = 0$

$R_2 = k_1 \oplus k_3 \oplus k_4$

$R_2 = 1 \oplus 0 \oplus 1$

$R_2 = 0$

$R_3 = k_2 \oplus k_3 \oplus k_4$

$R_3 = 0 \oplus 0 \oplus 1$

$R_3 = 1$

Now from MSB 3rd bit has error

So, $k_3$ has error.

1 0 0 1 1 0 0

$R_1 = k_1 \oplus k_2 \oplus k_4 = 1 \oplus 0 \oplus 1 = 0$

$R_2 = k_1 \oplus k_3 \oplus k_4 = 1 \oplus 1 \oplus 1 = 1$

$R_3 = k_2 \oplus k_3 \oplus k_4 = 0 \oplus 1 \oplus 1 = 0$

$R_2$ & $R_3$ are wrong so $k_3$ has error; and correct it to get correct data.

Past paper

Sol:- Total Data = 2500 byte

MTU = 550 byte

Identification Number = 380

IHL = 1001 = 9 x 4 = 36 bytes

Total data = 36 byte (header) + 2464 (data)

MTU = 36 byte + 514 (data)

$\frac{2464}{514} = 4.7 = 5$ fragments. ✓

| $F_5$ | $F_4$ | $F_3$ | $F_2$ | $F_1$ |
|---|---|---|---|---|
| 408 | | | 514 | 514 |
| 36 | | | | 36 |
| MF = 0 | | | | MF = 1 |
| FO = 257 | 192.75 | 128.5 | 514 = 8 | FO = 0 |
| | | | 64.25 | |

514 x 4 = 2056

- 2464

408

Identification Number will remain same.