Data Communication HW #3

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1. (c) $\log_2 4 = 2$.

(d) $\log_2 128 = 7$.

2. (c) $S = (1/r) \times N$ bit.

$r = \log_2 4 = 2$

$S = (1/2) \times 4,000$

$= 2,000$ ∴ 2,000 baud

(d) $r = \log_2 64 = 6$

$S = (1/6) \times 36,000$

$= 6,000$ ∴ 6,000 baud

3. (c) $N = r \times S$ bit.

$r = \log_2 2 = 1$

$N = 1 \times 1000$ ∴ 1,000 bps

(d) $r = \log_2 16 = 4$

$N = 4 \times 1,000$ ∴ 4,000 bps

4. Bit rate per channel = $\frac{10Mbps}{10} = 1Mbps$.

Bandwidth per channel = $\frac{1Mbps}{10} = 100kbps$.

$B = (1+d) \times \frac{N}{2}$ 이므로

$r = (1+d)\frac{N}{B} = (1+0) \times \frac{1Mbps}{100kbps} = 10$

$r = \log_2 L$ 이므로 $L = 1024$

∴ 1024-QAM 이 필요하다.

5. (c)

∴ peak amplitude = $\sqrt{2^2+2^2} = 2.83$

∴ QPSK or 4-QAM

(d)

∴ peak amplitude = 2

∴ BPSK

6. (c)

· frame size = 41 bit

· frame rate = 100,000 frames/s

∴ frame duration = $\frac{1}{100,000}$ s

(d) Data rate = 100,000 × 41 = 4,100,000

∴ 4.1 Mbps

7. (a) · frame size = 6 × (8+4) = 72 bits

· frame rate = 500 frames/s

∴ duration of an output frame = 1/500 = 2 ms

(d) data rate = 500 × 72 = 3600 bps

8. ∴ 4 × 10 + 0.5 × 9 = 44.5 kHz

9. (a) 8,000 frames/s のとき

∴ $\frac{1}{8000}$ s

(b)