

ELEX 3525 Final Exam Solutions

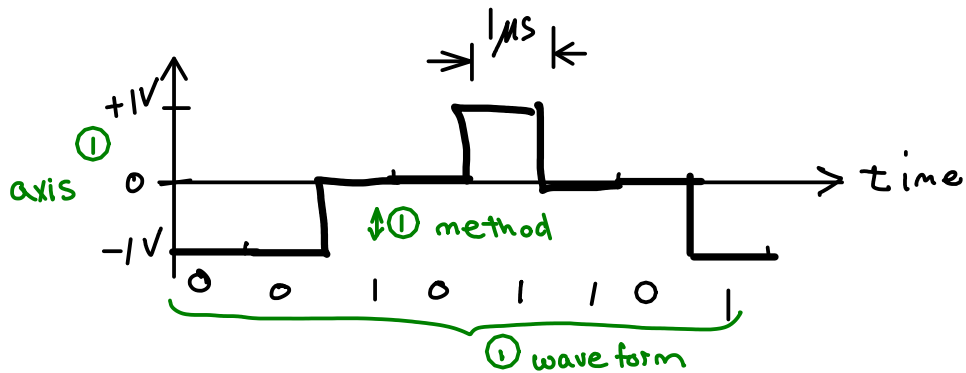
Q.1 (a) baud rate = $\frac{1}{\text{bit period}} = \frac{1}{1 \text{ ms}} = 1 \text{ kHz}$ ①

(b) data bits (LS to MS): 0 1 0 1 1 1 0 0
(MS to LS): 0 0 1 1 1 0 1 0 = $0x 3A$ ①
= 58 (':')

(c) parity bit is low (1) ①

(d) number of 1's = 4 (data) + 1 (parity) = 5
 \therefore an error has been made ①

Q.2



Q.3

$$B = 1 \text{ MHz}$$

$$C = 4 \text{ Mb/s}$$

$$N = 0 \text{ dBm} = 1 \text{ mW}$$
 ①

$$C = B \log_2 \left(1 + \frac{S}{N} \right)$$
 ①

$$S = ? \quad \frac{C}{B} = \frac{4}{1} = 4 = \log_2 \left(1 + \frac{S}{N} \right)$$

$$1 + \frac{S}{N} = 2^4 = 16 \quad \frac{S}{N} = 15$$
 ①

$$S = 15N = 15 \text{ mW} = 10 \log_{10}(15) = 12 \text{ dBm.}$$
 ①

