Course No: IGGC2204
Course Title: Understanding Telecommunications
Date: 27 / 03/ 2013
No. of Questions: 3
Time: 1 hour
Using Calculator (YES)

University of Palestine

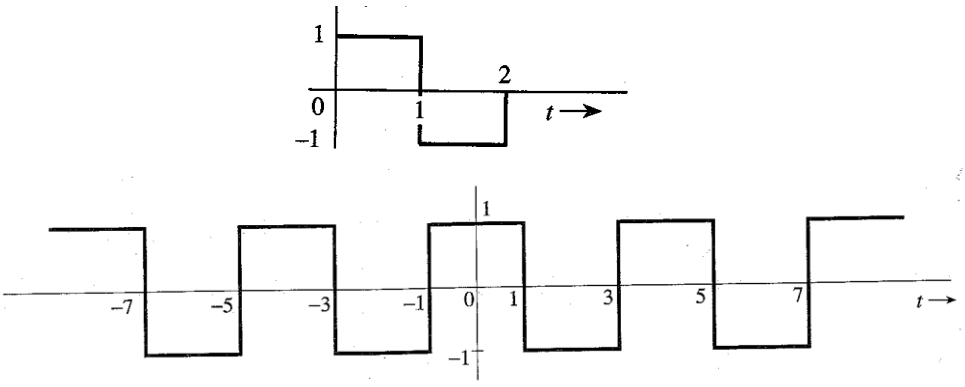
Midterm Exam
2nd semester 2012/2013
Total Grade: 100

Instructor Name: Dr. Anwar Mousa
Student No.: _____
Student Name: _____
College Name: Faculty of IT
Using Dictionary (No)

- ***Answer all Questions***

First Question — No. of Branches (3) — (35/100)

Q1 B1 (15/35)



(b)

Determine the energy of the signal in part (a) and the power of the signal in part (b) of the above figure.

Q1 B2 (15/35)

Determine the powers and the rms values of the following signals:

a. $g_1(t) = \sum_{n=1}^{4} 12\sin(\omega_n t + \theta_n)$

b. $g_2(t) = 5e^{j\omega_0 t}$

c. $g_3(t) = 9$

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Q1 B3 **(5/35)**

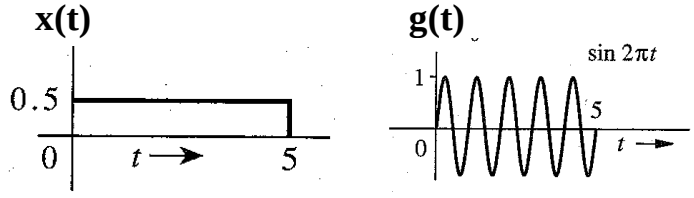
In a given communications system, 2Mpbs requires a channel bandwidth B_1=2MHz and a signal-to-noise ratio SNR_1=64. If the same rate is transmitted over a channel bandwidth B_2=6MHz, determine the required signal-to-noise ratio $SNR2$. Hint, $SNR_2 \cong SNR_1^{B_1/B_2}$

Second Question **No. of Branches (2)** **(30/100)**

Q2 B1 **(10/30)**

Prove that the energy of the sum of two orthogonal real signals is equal to the sum of the energies of the two signals

Q2 B2 **(15/30)**



Find the correlation coefficient between x(t) and g(t). *Hint*

$$c_n = \frac{1}{\sqrt{E_g E_x}} \int_{-\infty}^{\infty} g(t)x(t)\,dt$$

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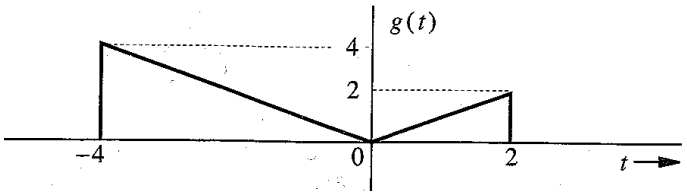
Third Question — No. of Branches (1) — (35/100)

Q3 B1 (15/35)



For the above signal g(t), find out the integrals:

a. $\int_{-\infty}^{\infty} g(t)\delta(t)dt$

b. $\int_{-\infty}^{\infty} g(t)\delta(t-2)dt$

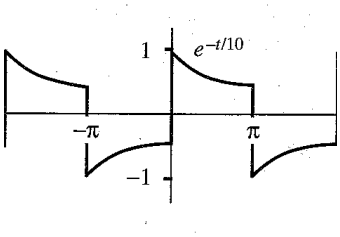
c. $\int_{-\infty}^{\infty} g(t)\delta(t+4)dt$

Q3 B2 (10/30)

For the above signal g(t), sketch

a) g(t+2)
b) g(2t)
c) g(t/1.5)
d) g(-t)

Q3 B3 (5/35)



If the above signal is multiplied by a unit step function, draw the resulting signal.

End of Questions
Good Luck