

King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering

COE 342 – Data & Computer Communications (T042)

Homework # 01 (due date: Tuesday 08/03/2005)

***** Show all your work. No credit will be given if work is not shown! *****

Problem # 1 (10 points): Write the following signal in the form $x(t) = A \sin(2\pi f_0 t + \phi)$. Also, find out the amplitude, the frequency and the phase for each signal.

$$x(t) = \frac{\sqrt{2}}{2} \cos\left(2 \times 10^4 t + \frac{\pi}{2}\right) + \frac{\sqrt{2}}{2} \sin\left(2 \times 10^4 t + \frac{\pi}{2}\right), \text{ (hint: } \sin\left(\frac{\pi}{4}\right) = \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \text{)}$$

Problem # 2 (5 points): Find the bandwidth for the following function:

$$s(t) = \cos(6\pi t) + 200 \sin(2\pi t) - 120 \sin(18\pi \times 10^3 t)$$

Problem # 3 (15 points): Consider the Triangular wave function listed in table B.1 of Appendix B (page 793) of the text book. Find the effective bandwidth of the transmitted signal such that it contains at least 99% of the total power of the original signal. (Show all steps of derivation).