Thapar Institute of Engineering & Technology, Patiala
Department of Electronics and Communication Engineering
UEC639 – Digital Communication
B. E. (Third Year): Semester-V (ENC)
Tutorial-1

Q1	Determine the Fourier transform of the following signal and its highest frequency component $$x_2(t) = A\,Sin(2\,\pi\,f\,t)\,/\,\pi\,t$$
Q2	Find the Nyquist rate and Nyquist interval for the following signals (i) $\quad x_1(t) = 10\,Sin(2000\,\pi\,t)\,Cos(6000\,\pi\,t)$ (ii) $\quad x_2(t) = Sin(200\,\pi\,t)\,/\,\pi\,t$ (iii) $\quad x_3(t) = \left(\frac{Sin(200\,\pi\,t)}{\pi\,t}\right)^2$
Q3	Express the sampling expression for low-pass signal in time-domain. Using this expression, derive the sampling expression for low-pass signal in frequency-domain.
Q4	Derive the reconstruction equation (sampling theorem) to obtain the continuous-time signal from its sampled version. Discuss about the interpolation function.
Q5	Define the sampling theorem for band-pass signal in time-domain
Q6	Given the signal $$m(t) = 10\cos 2000\pi t \,\cos 8000\pi t$$ (a) What is the minimum sampling rate based on the low-pass uniform sampling theorem? (b) Repeat (a) based on the bandpass sampling theorem.