Government College of Engineering, Aurangabad

(An Autonomous Institute of Government of Maharashtra)

T.E(Electronics & Telecomunication) Examination

End Semester Examination N/D 2016

ET 343: DIGITAL SIGNAL PROCESSING

Time: Three Hours 17 NOV 2016 *Max. Marks. 60*

"Verify the course code and check whether you have got the correct question paper"

N.B:-

1. **Solve any Six questions**
2. **Figure to the right indicates full marks**
3. **Assume suitable data if necessary and state it clearly**

Q.1(a)	1	What is the need for multirate signal processing	**[01]**
	2	What is frequency wraping? What is the cause of this effect	**[01]**
	3	Define DFT of a sequence x{n}	**[01]**
	4	What is an FIR system? Compare an FIR system with an IIR system	**[01]**
Q.1 (b)		The analog signal is given by $x(t)=5\cos 2000\pi t + 3\sin 6000\pi t + 2\cos 12000\pi t$ Determine the Nyquist rate for this signal If the sampling rate fs=5000 samples /s, find the discrete –time signal x[n] after sampling	**[04]**
Q.1 (c)		Check whether each of this following signal is linear, time variant and stable system X[n]=u[n]; x[n]=n u[n-1]	**[02]**
Q.2		Compute the FFT of the sequence $x[n]=2^n$, where N=8 using DIT FFT algorithm	**[10]**
Q.3		Design an ideal high pass filter with a frequency response $H_d(\omega) = 1$; for $\pi/4 \le \lvert\omega\rvert \le \pi$ $= 0$; for $\lvert\omega\rvert \le \pi$ find the value of h(n) for N=11 using Hamming window	**[10]**
Q.4		Design an analog Butterworth digital filter using bilinear transformation that satisfied the following specification $0.89 \le \lvert H(\omega)\rvert \le 1.0$ $\quad 0 \le \lvert\omega\rvert \le 0.2\pi$ $\le \lvert H(\omega)\rvert \le 0.18,$ $\quad 0.3\pi \le \lvert\omega\rvert \le \pi$	**[10]**