Paper Code: MEE-211	**Roll No.**									

M.Tech.
(SEM II) EVEN SEMESTER EXAMINATION, 2015-16
DIGITAL SIGNAL PROCESSING

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- Attempt All questions. All questions carry equal marks.

1. Attempt any four parts of the following: - **[5x4 = 20]**

(a) Describe sampling theorem.
(b) Explain Antialising pre filters.
(c) Explain spectra of sampled signals.
(d) Explain Analog Reconstructors.
(e) Give Basic Components of DSP Systems.
(f) a wheel is rotating at 6 Hz, is seen in a dark room by means of a strobe light flashing at a rate of 8 Hz. Determine the apparent rotational speed and sense of rotation of the wheel. Repeat the question if the flashes occur at 12 Hz, 16 Hz, or 24 Hz.

2. Attempt any four parts of the following: - **[5x4 = 20]**

(a) Explain Quantization Process
(b) Hard disk recording systems for digital audio are becoming widely available. It is often quoted that to record 1 minute of "CD quality" digital audio in stereo, one needs about 10 Megabytes of hard disk for further processing. Derive this result, explaining reasoning.
(c) Explain oversampling and noise shaping.
(d) Explain D/ A convertors.
(e) Explain A/D convertors.
(f) Explain Analog and digital Dithers.

3. Attempt any two parts of the following: - **[10x2 =20]**

(a) Explain Linearity and Time Invariance.
(b) Explain Causality and Stability in discrete time signals.
(c) Determine the convolutional form and the (causal) impulse response of IIR filter described by the following difference equation $y(n) = - 0.8y (n-1) + x(n)$

4. Attempt any two parts of the following: - **[10x2 =20]**

(a) Explain Block processing methods.

(b) Draw the direct form realization and write the corresponding sample processing algorithm of FIR filter defined by the I/O equation

$$y(n) = x (n) – x(n-4)$$

for the input x = [1,1,2,1,2,2,2,1,1], compute the output using the sample processing algorithm.

(c) Explain Hardware Realizations and Circular Buffers

5. Attempt any two parts of the following: - **[10x2 =20]**

(a) Explain direct form realizations of digital filters.
(b) Explain Canonical realization form of digital filters.
(c) Explain Different Digital audio effects.