Reg. No.										

MANIPAL UNIVERSITY
SCHOOL OF INFORMATION SCIENCES

SECOND SEMESTER MASTER OF ENGINEERING – **ME** (MEDICAL SOFTWARE)
DEGREE EXAMINATION – APRIL / MAY 2016

SUBJECT: MMS 616.1 (ELECTIVE 1) – BIOMEDICAL SIGNAL PROCESSING

Time: 10.00 – 13.00 Hrs. 4/5/2016 Max. Marks: 100

1. Compute the DFT of the sequence x(n) = [1, 1, 1, 1, 0, 0, 0, 0] using DIT-FFT algorithm. Draw the flow graph indicating the intermediate values.

(10 marks)

2. Realize the following system functions using Direct form-I, Direct form-II and CSOS / PSOS
   $H(z) = [(z2 + 0.5z + 1)(z + 0.6)] / [(z2 + 0.6z + 0.2)(z - 0.8)]$

(10 marks)

3. Implement the frequency sampling structure for the following impulse responses.
   $h(n) = 2\delta(n) + 0.5\delta(n-1) + 0.5\delta(n-7)$

(10 marks)

4. Design an FIR linear phase lowpass filter using windows to meet the following specifications.
   $0.99 < |H(e^{jw})| \leq 1.01$; for $0 \leq |w| \leq 0.19\pi$
   $|H(e^{jw})| \leq 0.01$; for $0.21\pi \leq |w| \leq \pi$.

(10 marks)

5. Design and realize a Butterworth / Schebychev lowpass analog filter whose Passband magnitude is to be constant within 1 dB for frequencies below 0.2π rad/sec and stopband attenuation is to be greater than 15 dB for frequencies above 0.3π rad/sec.

(10 marks)

6. With a neat diagram explain the anatomy of the brain.

(10 marks)

7. Explain 12 lead ECG Acquisition system

(10 marks)

8. What is data reduction technique? Explain any one lossless data reduction technique

(10 marks)

9. Explain FAN algorithm with an example

(10 marks)

10. Explain QRS detection technique with the help of neat block diagram

(10 marks)

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