Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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B.Tech.(EIE) (2011 Onwards) (Sem.–6)

DIGITAL SIGNAL PROCESSING

Subject Code : EC-310

M.Code : 58034

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Q1. Answer briefly :

a) What do you mean by the terms : signal and signal processing?

b) Differentiate between a digital signal processor and a microprocessor?

c) How the aliasing is avoided in digital signal processing?

d) Differentiate between a static and a dynamic system?

e) Sketch the signal u(–n + 4).u(n).

f) What is the floating point concept in DSP?

g) Distinguish between the Fourier series and Fourier transform.

h) What is frequency wrapping?

i) Explain Parseval's theorem.

j) Determine the periodicity of the signal $x(t)=4\sin\frac{2\pi t}{7}+5\sin\frac{2\pi t}{9}$

SECTION-B

Q2. A system has an impulse response $h(n) = -0.25\delta(n+1) + 0.5\delta(n) - 0.25\delta(n-1)$

(a) Is the system BIBO stable?

(b) Is the system causal? Justify your answer.

Q3. Find the inverse z-transform of $X(z) = \dfrac{1}{1-0.8z^{-1}+0.12z^{-1}}$ if ROC is $|z| > 0.6$

Q4. A causal system is presented by the following difference equation :

$$y(n)+\frac{1}{4}y(n-1) = x(n)+\frac{1}{2}x(n-1)$$

Find the impulse response of the system

Q5. Compute the DFT of the sequence $x(n) = \{0,1,2,3\}$.

Q6. Compare the characteristics of the various types of analog filters.

SECTION-C

Q7. Find the direct form-I and form-II realization for the system described by the difference equation

$$y(n) = x(n) + 0.5x(n-1) + 0.4x(n-2) - 0.6y(n-1) - 0.7y(n-2)$$

Q8. Design a linear phase low pass FIR filter with 7 taps and a cut off frequency of 0.3π radians using frequency sampling method.

Q9. (a) Add $+4_{10}$ and $+0.375_{10}$ by floating point addition. Choose 10 bit floating point format with 7-bits for mantissa and 3 bits for exponent.

(b) Explain the generic architecture of a digital signal processor.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.