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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 $x(t) = 4\sin\frac{2\pi t}{7} + 5\sin\frac{2\pi t}{9}$



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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*) = $\frac{1}{1 0.8z^{-1} + 0.12z^{-1}}$ 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.

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