

Total No. of Questions : 10]

SEAT No. :

**P3538**

**[5560]-190**

[Total No. of Pages : 2

**T.E. (Computer Engineering)**  
**DIGITAL SIGNAL PROCESSING APPLICATIONS**  
**(2012 Pattern) (Semester - II) (310253)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Assume Suitable data if necessary.*

**Q1)** a) Define mean, standard deviation, SNR, histogram and probability density function. **[5]**

b) State and define the periodic and non-periodic signal, even and odd signal also energy and power signal. **[5]**

OR

**Q2)** a) Find the circular convolution of  $x(n) = \{1, 2, 2, 1\}$  and  $h(n) = \{1, 2, 3, 1\}$  using matrix method. **[5]**

b) Show the relationship between DFT and DTFT. **[5]**

**Q3)** a) Compare between Radix-2 DIT FFT and DIF FFT algorithms. **[5]**

b) State and explain any two properties in terms of z-transform. **[5]**

OR

**Q4)** a) State and explain any three properties in terms of Fourier transform. **[5]**

b) Draw the neat flow graph for DIF FFT algorithm and consider  $N = 8$ . **[5]**

**Q5)** a) Describe the characteristic of filter and all pass filters. **[9]**

b) A DT System is given by

$$y(n) = \left(\frac{3}{4}\right)y(n-1) - \left(\frac{1}{8}\right)y(n-2) + x(n) + \left(\frac{1}{2}\right)x(n-1)$$

Obtain and Draw Direct Form - I and Direct Form - II IIR filter structure. **[9]**

OR

**P.T.O.**

**Q6)** a) Obtain and realize linear phase FIR filter structure having impulse response

$$h(n) = \delta(n) + \frac{1}{2}\delta(n-1) - \frac{1}{4}\delta(n-2) + \frac{1}{2}\delta(n-3) + \delta(n-4) \quad [9]$$

b) Derive the Direct Form-II IIR filter structure from system function  $H(Z)$  and represent it using multipliers, adders and delay elements. [9]

**Q7)** a) Describe about the SIMD architecture and instructions. [8]

b) Explain the application of DSP in telecommunication and biomedical. [8]

OR

**Q8)** a) What is OMAP? Explain the Software architecture of OMAP in brief. [8]

b) Write short note on OMAP multimedia applications. [8]

**Q9)** a) Explain the gray scale image is different than color image. Write short note on image enhancement. [8]

b) Write a short note on audio processing. [8]

OR

**Q10)** a) What is Companding? How important this process is in audio processing? Explain the high fidelity audio in brief. [8]

b) Explain the brightness, contrast adjustment and gray scale transformation in brief. [8]

**x x x**