

Total No. of Questions : 6]

SEAT No. :

**P30**

**TE/Insem./APR - 34**

[Total No. of Pages : 2

**T.E. (Electronics Engineering)  
304206 : DSP and Applications  
(2015 Pattern) (Semester - II)**

**Time : 1 Hour]**

**[Max. Marks : 30**

**Instructions to the candidates:**

- 1) Answer Q1. or Q.2., Q.3. or Q.4., Q.5. or Q.6.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn whenever necessary.
- 4) Assume suitable data, if necessary.

**Q1) a)**

State sampling theorem for band-pass signals.

What is the minimum sampling frequency for the following signal [5]

$$x(t) = 2\cos(100 * \pi * t) * 5\sin(300 * \pi * t)$$

What will happen if sampling frequency is less than Nyquist rate?

b)

State advantages and limitations of DSP systems [5]

**Q2) a)**

What are applications of DSP? [5]

b)

Define Multirate sampling.

What are different types of Multirate sampling? Explain any one type with proper block diagram and waveforms. [5]

**Q3) a)**

List all the properties of DFT. Write mathematical expression and significance of any two properties. [5]

b)

Find 4 point DFT for given sequence [5]

$$x[n] = [1 \ 0 \ 1 \ 0]$$

OR

**Q4) a)** Find circular convolution of given sequences using graphical method. [5]

$$x[n] = [1 \ 2 \ 3 \ 4] \text{ and } h[n] = [2 \ 0 \ 2 \ 0]$$

b) Find 4 point DFT for given sequence using DIT FFT method [5]

$$x[n] = [1 \ 3 \ 5 \ 7]$$

**Q5) a)** State time shifting and convolution property of Z transform with effect on ROC. [5]

b) A causal LTI system has transfer function [5]

$$H(Z) = 1/(1 - 1.5Z^{-1} - Z^2)$$

What is Roc of transfer function? Is system stable?

OR

**Q6) a)** A system has impulse response  $h(n)$ . Poles of systems are at  $Z_1 = 1$ ,  $P_1 = -0.5$  and  $P_2 = -0.25$ . Draw pole and zeros of system if its impulse response is  $h_1(n) = h(n-2)$  [5]

b) Determine Z – transform of [5]

a)  $X(n) = \cos(\omega_0 n) u(n)$

b)  $X(n) = \sin(\omega_0 n) u(n)$