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 Name of Examination : **Winter 2020** - (Preview)

 Course Code & Course Name : **ET305U - Digital Signal Processing**

 Generated At : **18-04-2022 16:29:48**

 Maximum Marks : **60**

 Duration : **3 Hrs**
[Edit](#) [Print](#) [View Answer Key](#) [Close](#) **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

**1) Solve the Following**

- a) What are the main merits of digital signals over analog? [6]
- b) What are the applications of digital signal processing? [6]

**2) Solve any Two**

- a) What are the properties of discrete Fourier transform [6]
- b) Determine the IDFT of  $X(k) = \{3, (2+j), 1, (2-j)\}$  [6]
- c)  $x(n) = \{0, 1, 2, 3, 4, 5, 6, 7\}$  find  $X(k)$  using DIT FFT algorithm [6]

**3) Solve any Two**

- a) What are the properties of Z transform? [6]
- b) Find the z-transform of  $x(n) = n^2 u(n)$  [6]
- c) By using partial fraction expansion method, find the inverse z-transform of [6]

$$H(z) = \frac{-4 + 8z^{-1}}{1 + 6z^{-1} + 8z^{-2}}$$

**4) Solve the Following**

- a) What is difference between FIR and IIR filters? [6]
- b) A low pass filter has the desired response as given below [6]  
Determine the filter coefficients  $h(n)$  for  $M=7$ , using type-I frequency sampling technique

$$H_d(e^{j\omega}) = \begin{cases} e^{-j3\omega} & 0 \leq \omega < \pi/2 \\ 0 & \pi/2 \leq \omega \leq \pi \end{cases}$$

**5) Solve any Two**

- a) determine  $H(z)$  using the impulse invariant technique for the analog system function [6]

$$H(s) = \frac{1}{(s + 0.5) + (s^2 + 0.5s + 2)}$$

- b) Explain block diagram of TMS320C67xx? [6]
- c) Using bilinear transformation obtain  $H(z)$  if [6]

$$H(s) = \frac{1}{(s + 1)^2}$$

 and  $T=0.1s$