

SANT GADGE BABA AMRVATI UNIVERSITY, AMRAVATI
Summer Examination 2020
HVPM's College of Engineering and Technology, Amravati
Department of Electronics & Tele communication
Engineering
Bachelor of Engineering Sem. :- VII

Subject :- DIGITAL SIGNAL PROCESSING

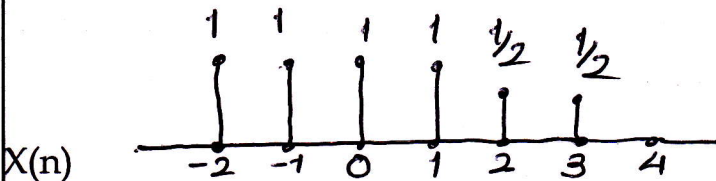
Code :- 7XT3

Instructions:-

- 1) Solve any two questions
- 2) All question carry equal marks

Que. 1		
a	Write the advantages of digital signal processing (DSP) over analog signal processing (ASP).	1 credit point
b	If $x(z) = z/z-a$, $n \geq 0$ find z^{-1} using method of residue.	2 credit point
c	If $x(n) = \{1 \ 1 \ 0 \ 0\}$ find 4-point DFT by matrix method.	2 credit point
d	Sketch direct form for the FIR System $H(z) = 1-2Z^{-1}+1/2Z^{-2}+1/2Z^{-3}-1/2Z^{-4}$	2 credit point
e	Draw direct I direct II form of the filter represented by, $y(n) = 3/4 y(n-1) + 1/8 y(n-2) + x(n) + 1/4 x(n-1)$	2 credit point
f	State & explain various applications of multirate digital signal processing.	1 credit point
Que. 2		
a	A discrete time sequence is $X(n) = 1+n/3$; $-3 \leq n \leq -1$ $= 1$, $0 \leq n \leq 3$ $= 0$ Elsewhere	1 credit point
b	State and Explain any two properties of Z-transform.	2 credit point
c	Obtain circular convolution by matrix method if $x_1(n) = \{1 \ 2 \ 2 \ 1\}$ & $x_2(n) = \{1 \ 2 \ 3 \ 1\}$	2 credit point
d	Draw linear phase structure for $h(n) = \{1 \ 2 \ 3 \ 3 \ 2 \ 1\}$ ↑	2 credit point

e	If $H_a(s) = 1/(s+1)(s-2)$, using impulse invariant method, find $H(z)$ for sampling frequency 10 Hz.	2 credit point
f	Draw & explain the architecture of DSP processor TMS 320C54XX	1 credit point
Que. 3		
a	Determine if the systems described by the following input - output are linear or non-linear i) $y(n) = n x(n)$ ii) $y(n) = x^2(n)$	2 credit point
b	Define region of convergence (ROC) & explain different properties of ROC.	2 credit point
c	Find 4-point DFT using DITFFT algorithm for $x(n) = \{1 \quad 1 \quad 0 \quad 0\}$ ↑	2 credit point
d	Design an FIR digital filter to approximate an ideal low filter with pass band gain of unity , cut-off frequency of 850 Hz & working at sampling frequency $f_s = 5000$ Hz. The length of impulse response should be 5. Use a rectangular window	2 credit point
e	If $H_a(s) = 1/(s+0.1)^2 + 9$ Find $H(z)$ by approximation of derivative method for $T = 1$ Sec. and realize using direct form.	1 credit point
f	Find the expression for the output $y(n)$ in terms of input $x(n)$ for the multisampling rate system given as follows:- $x(n)$ Input → [↑5] → [↓20] → [↓4] → output $y(n)$	1 credit point

Que. 4		
a	<p>If a discrete time sequence $x(n)$ is</p>  <p>Sketch (i) $x(n-2)$ (ii) $x(2-n)$ (iii) $x(n) \cdot 4(2-n)$ (iv) $x(n^2)$</p>	1 credit point
b	Solve $y(n+2) - 5y(n+1) + 6y(n) = y(n)$ with initial condition $y(0) = 0$ & $y(1) = 1$	1 credit point
c	If $X(K) = \{2, 1-j, 0, 1+j\}$, find 4 point IDFT.	2 credit point
d	Realize digital filter for $H(Z) = 1 - 3/4 Z^{-1} + 1/8 Z^{-2}$ in cascade form.	2 credit point
e	<p>Realize the filter $H(z) = \frac{1 + 1/3 z^{-1}}{1 - 3/4 z^{-1} + 1/8 z^{-2}}$</p> <p>In cascade form.</p>	2 credit point
f	<p>Write short notes on:-</p> <p>i) Decimator ii) Interpolator</p>	2 credit point
