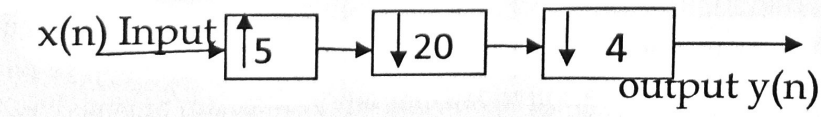
SANT GADGE BABA AMRVATI UNIVERSITY, AMRAVATI
Summer Examination 2020
HVPM's College of Engineering and Technology, Amravati
Department of Electronics & Tele communication Engineering
Bachelor of Engineering Sem. :- VI

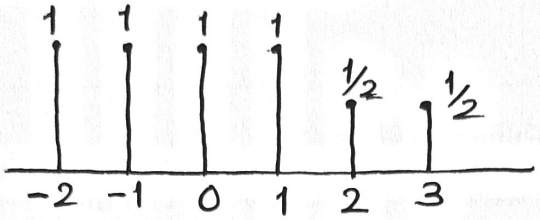
Subject :- DIGITAL SIGNAL PROCESSING **Code :- 6ET4**

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 $x(z) = z/z-a$, $n \geq o$ find z^{-1} using method of residue.	2 credit point
c	If $x(n) = \{1 \quad 1 \quad 0 \quad 0\}$ find 4-point DFT by matrix method.	2 credit point
d	Sketch direct form for the FIR System $H(z) = 1- 2 Z^{-1}+1/2 Z^{-2} + ½ Z^{-3} - ½ Z^{-4}$	2 credit point
e	Draw direct I direct II form of the filter represented by, $y(n) = ¾ y(n-1) + 1/8 y(n-2) + x(n) + ¼ x(n-1)$	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 Sketch a sequence resulting by first folding and then delaying by 2 samples.	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 $h(n) = \{1 \underset{\uparrow}{} 2 \quad 3 \quad 3 \quad 2 \quad 1\}$	2 credit point
e	If $Ha(s) = 1/(s+1)(s-2)$, 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 $x(n) = \{1 \underset{\uparrow}{} 1 \quad 0 \quad 0\}$	2 credit point
d	Design an FIR digital filter to approximate an ideal low filter with passband gain of unity , cut-off frequency of 850 Hz & working at sampling frequency fs =5000 Hz. The length of impulse response should be 5. Use a rectangular window	2 credit point
e	If $Ha(s) = 1/(s+0.1)^2 + 9$ 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:- 	1 credit point

Que. 4		
a	If a discrete time sequence x(n) is X(n)  Sketch (i) x (n-2) (ii) x (2-n) (iii) x (n) . 4 (2-n) (iv) x (n^2)	1 credit point
b	Solve y (n+2) – 5 y(n+1) + 6 y(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	Realize the filter H(z) = $\frac{1 + \frac{1}{3}\bar{z}^{1}}{1 - \frac{3}{4}\bar{z}^{1} + \frac{1}{8}\bar{z}^{2}}$ In cascade form.	2 credit point
f	Write short notes on:- i) Decimator ii) Interpolator	2 credit point

---