

M.TECH. INSTRUMENTATION AND ELECTRONICS ENGINEERING FIRST YEAR SECOND SEMESTER – 2025

Subject: DIGITAL SIGNAL PROCESSORS

Full Marks : 100

Time: 3 Hours

Answer any **Five** of the following Questions :- 20x5

1. a) Obtain DTFT of the below signals [**CO1/K1**]

i) $x(n)=a^n u(n)$ [5x2=10]

ii) $x(n)=\{1,1,1,1\}$

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

c) Find out N-Point DFT of $X(n)=1; 0 \leq n \leq N-1$ [5]
 $=0$; otherwise

2. a) Determine 2-point DFT of the of the following sequences $x(n) = u(n)-u(n-2)$. [10] [**CO1/K1**]

b) Obtain the circular convolution of the two sequences

i) $X_1(n)=\{3,5,4,7\}$, $X_2(n)=\{1,2,3,4\}$

ii) $X_1(n)=\{1,1,1,1,-1,-1,-1,-1\}$ and $X_2(n)=\{0,1,2,3,4,3,2,1\}$ [10]

3. a) Draw and explain the CPU Architecture of TMS320C6713 DSP processor. [**CO2/K1**]

b) Write a program of sum of product in TMS320C6713 DSP Processor

$$y = \sum_{n=1}^{40} a_n * x_n. \quad [10+10]$$

4. a) Draw and explain the LCD Controller of TMS 320C6748 DSP processor. [**CO2/K2**]

b) Write about the General-Purpose Input/Output (GPIO) of TMS 320C6748 DSP processor. [10+10]

5. a) Write a program to generate a sine wave and its output in TMS 320C6748 DSP processor. [**CO3/K2**]

b) Write a program to calculate the linear convolution of the two-given sequence in TMS 320C6748 DSP processor. [10+10]

6. a) Write a program to calculate the Energy and Power samples for discrete time signals in TMS320C6748 DSP processor. [**CO3/K2**]

b) Write a program of Echo Effect in TMS 320C6748 processor. [10+10]

7. a) Write a program to create Delay in TMS 320C6748 processor. [**CO4/K2**]

b) Explain DMA controllers for the TMS 320C6748 processor. Write a short note on interrupts in the TMS 320C6748 processor. [10+10]

[Turn over

8. a) Write the features of Multi-Channel Audio Serial Ports (MCASP) C6748 processor. **[CO4/K3]**
b) Write a short note on Real time Clock (RTC) in TMS 320C6748 processor. [10+10]
9. a) Write about Inter-Integrated Circuit (I2C) Module of TMS 320C6748 processor. **[CO4/K3]**
b) Write about Multichannel Buffered Serial Port (McBSP) of TMS 320C6748 processor. [10+10]

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