

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Winter Examination 2023**

**Course: B. Tech. Branch: Electrical Engg Semester: VII**

**Subject Code & Name: BTEEE705A & Digital Signal Processing**

**Max Marks: 60**

**Date:09/02/2023**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q.1 Solve Any Two of the following.**

**12**

**A) Enlist advantages of digital signal processing over analog signal processing**

**6**

**B) Differentiate between**

**6**

i) Deterministic Vs Random signals

ii) Multichannel Vs Multidimensional signal

iii) Continuous Valued Vs Discrete valued Signal

**C) State & Prove Sampling Theorem**

**6**

**Q.2 Solve Any Two of the following.**

**12**

**A) Give the classification of Discrete time systems**

**6**

**B) Perform the convolution sum of the following sequences**

**6**

$h(n)=(1,2,1,-1)$  &  $x(n)=(1,2,3,1)$

**C) Explain properties of convolution sum**

**6**

**Q.3 Solve Any Two of the following.**

**12**

**A) Determine the Z transform of the unit step function**

**6**

**B) Explain differentiation property & time shifting property of Z transform**

**6**

**C) Determine Inverse Z transform of  $X(Z)$**

**6**

$X(Z)=Z/(3Z^2-4Z+1)$  Where ROC  $|Z|>1$

**Q.4 Solve Any Two of the following.**

**12**

**A) Explain Frequency shifting & Periodicity properties of the Fourier transform**

**6**

**B) Find Fourier transform of the following signal**

**6**

$x(n)=1/3$  ( for n value between -1 to 1)

= 0 (elsewhere)

**C) Perform circular convolution of the following sequences**

**6**

$$x_1(n) = (1, 2, 5, 3) \quad \& \quad x_2(n) = (2, 3, 1, 4)$$

**Q. 5 Solve Any Two of the following.**

**12**

**A)** Explain any two properties of DFT

**6**

**B)** Differentiate between IIR & FIR systems

**6**

**C)** A filter is described by  $Y(n) - 3/4Y(n-1) + 1/8Y(n-2) = X(n) + 1/2X(n-1)$

**6**

Draw (i) Direct form-I (ii) Direct form-II realizations

**\*\*\* End \*\*\***