

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
Supplementary End Sem Examination- Summer 2024

Course : B.Tech

Semester: III

Branch: Artificial Intelligence and Data Science Engineering and Allied branches

Subject Name : Digital Logic and Signal Processing

Subject Code: BTAIES305_Y23 / BTESC305_Y22

Total Marks: 60

Date: 09/07/2024

Duration: 3 Hrs

Instructions to the students:

1. All questions are compulsory.
2. Assume suitable data wherever necessary.

Q.1 Attempt any two of following.

Level/CO Marks

1. Draw and explain following logic gates i)AND
ii)EXOR iii)OR
2. Perform the following operation
i) 11001×1011 iii) $100100 \div 111$
3. Convert i) $(65)_H$ into octal, binary number system
ii) $(17)_O$ into Hexadecimal and binary number system

CO1/L2 **6**

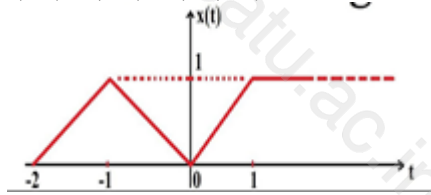
CO1/L3 **6**

CO1/L3 **6**

Q.2 Attempt any two of following.

1. Sketch following signals for $x(t)$ given as shown below
i) $x(3t)$ ii) $x(t-2)$ iii) $x(1-t)$

CO2/L3 **6**



2. Check the signal is periodic or not and find fundamental period if periodic.

CO2/L3 **6**

i) $X(t) = 2\sin 5\pi t + 5\cos(2\pi t)$ ii) $x(n) = 2\cos 5n$

3. Check the signal is time variant or time invariant

CO2/L3 **6**

i) $y(t) = x(-t)$ ii) $y(t) = t \cdot x(t)$

Q.3 Attempt any two of following.

1. Perform linear convolution using graphical method:
 $x(n) = \{1, 0, -1, 3\}$ $h(n) = \{1, 2, 3, 2\}$ where $x(0) = -1$, $h(0) = 1$
2. Perform circular convolution of
 $x(n) = \{1, 2, 1, 2\}$ $h(n) = \{1, 1, 1, 1\}$
3. Find 4 point DFT of $x(n) = \{1, 2, 3, 4\}$

CO3/L3 **6**

CO3/L3 **6**

CO3/L3 **6**

Q.4 Attempt any two of following.

1. Find inverse z transform of $X(Z) = \frac{1}{1 - 0.8z^{-1} + 0.12z^{-2}}$
using power series method.
2. Find z transform and state ROC of following sequence:
i) $x(n) = 0.5^n u(n-1)$ ii) $x(n) = u(n)$
3. State and prove any two properties of z transform.

CO4/L3 **6**

CO4/L3 **6**

CO4/L3 **6**

Q.5 Attempt any two of following.

1. State properties of autocorrelation.
2. State properties of energy spectral density.
3. Find auto correlation of $x(n) = \{1, 2, 2, 1\}$

CO5/L2 **6**

CO5/L2 **6**

CO5/L3 **6**

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