

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -I EXAMINATIONS-2022

M.Tech-I Semester (ECE-IOT)

COURSE CODE (CREDITS): 21M1WEC136 (3)

MAX. MARKS: 15

COURSE NAME: Intelligent Signal Processing

COURSE INSTRUCTORS: Dr. Sunil Datt Sharma

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. Compute the Autoregressive model coefficients $a = [a_1, a_2, a_3]$ if its autocorrelation vector

$$r = [1, 1, 1] \text{ and autocorrelation matrix } R = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 2 \\ 3 & 2 & 1 \end{bmatrix}.$$

[03] [CO-1]

Q2. Compute DFT of the sequence $x(n) = [1, 2, 3, 4]$ and plot its magnitude spectrum.

[03] [CO-2]

Q3. If the sample sequence of a random process has $N=1000$ samples, then find the frequency resolution of the Bartlett method for quality factor $Q=10$.

[03] [CO-1]

Q4. Write three basic issues of the non-parametric power spectrum estimation.

[03] [CO-1]

Q5. If the sample sequence of a random process has $N=2000$ samples, then find the record length of the Welch (50% overlap) method for quality factor $Q=5$.

[03] [CO-1]