

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2016

M.Tech (ECE) 2nd Semester

COURSE CODE: 10M11EC211

MAX. MARKS: 15

COURSE NAME: Advanced Digital Signal Processing

COURSE CREDITS: 03

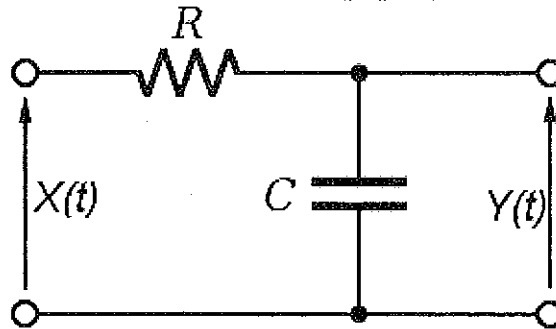
MAX. TIME: 1 HR

Note: All questions are compulsory.

Carrying of mobile phone during examinations will be treated as case of unfair means.

Write your assumptions clearly, if it is required.

- The input $X(t)$ to the RC filter shown below is a white noise process. [3+3=6 Marks]
 - Determine the power spectrum of the output process $Y(t)$.
 - Determine the mean-square value of $Y(t)$.



- Consider the ARMA process generated by the difference equation

$$x(n) = 1.6x(n - 1) + 0.63x(n - 2) + w(n) + 0.9w(n - 1)$$
 Determine the system function (Z-Transform) of the whitening filter and its poles and zeros. [3+2=5 Marks]
- Consider the output power spectral density of the innovation filter is

$$S_X(\omega) = \frac{5 - 4 \cos(\omega)}{10 - 6 \cos(\omega)}$$

Factorize the $S_X(\omega)$ in to minimum phase and maximum phase factors i.e. $H(z)$ and $H(z^{-1})$. [4 Marks]
