

**Part B**

2. (a) Determine the  $z$  transform of the signal : **10**  
 $x(n) = n a^n u(n)$
- (b) Write steps of FFT algorithms. **5**
3. (a) Write characteristics of LTI Systems. **5**
- (b) How will you reconstruct analog signals from digital signals ? Explain in detail. **10**
4. Illustrate the designing methods for FIR digital filters by using window techniques. **15**
5. (a) Differentiate between band pass and band stop filters. **5**
- (b) Give design steps for digital IIR filters by using Butterworth techniques. **10**
6. (a) Explain the effect of Finite register length in FIR filter design. **10**
- (b) Explain multirate signal processing. **5**
7. Differentiate between parametric and non-parametric spectral estimation. How are these implemented ? What are their applications ? **15**

May 2024

**B.Tech. (ENC) (Sixth Semester)**

**Digital Signal Processing (ECC-04)**

*Time : 3 Hours]*

*[Maximum Marks : 75*

**Note :** It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

**Part A**

1. (a) Define unit sample sequence. **1.5**
- (b) Define unit step signal. **1.5**
- (c) Define Energy signals. **1.5**
- (d) What are non-linear systems ? **1.5**
- (e) Define Causal Systems. **1.5**
- (f) Define Recursive Systems. **1.5**
- (g) What do you mean by convolution ? **1.5**
- (h) Define initial value theorem. **1.5**
- (i) Define filter properties. **1.5**
- (j) Define Discrete Fourier Transforms. **1.5**