Exam Roll: …………………………………………………………

Exam Roll in words: ……………………………………………………

School: SOE	Level: BE	Invigilator's Sign: ………………..
Program: BEEE	Year/Part: IV/I	Superintendent's Sign: …………
Subject: Digital Signal Processing (EG716EX)		Code No. …………………………

------------------✂-------------------------------------✂--✂------------------------------

Code No. [   ]

   i.   *Answers should be given by filling the Multiple-Choice Questions' Answer Sheet.*
   ii.   *The main answer sheet can be used for rough work.*

GROUP A *(Multiple-Choice Questions)*	**[10x1=10]**	**Time: 20 Minutes**

1. Continuous time signal is converted into discrete time signal by ………………

   a) sampling   b) quantizing   c) encoding   d) addition

2. Z-transform of $x(n) = \delta(n)$ is ………………

   a) 1   b) $1 + z^{-1}$ c) 0   d) infinity

3. What is the set of values of z for which $X(z)$ attains a finite value?

   a) poles   b) convergence   **c) ROC**   d) divergence

4. Complex multiplication terms in N-point DFT computation is……………

   a) N   b) $\log_2 N$ c) 64   **d) N^2**

5. Multiplication of two DFTs is equivalent to ……………….in time domain.

   a) circular convolution   b) linear convolution

   c) addition   d) multiplication

6. Limit cycle oscillations in recursive system arises due to …………..

   a) time variant   b) stability   **c) quantization**   d) linearity

7. Which of the following method is used to convert analog filter into digital filter?

   a) window technique   **b) bilinear transformation**

   c) spectral transformation   d) Fourier series method

8. The impulse response of IIR filter is…………..

   a) finite   **b) infinite**   c) 1   d) zero

9. In ……… realization, H(z) is decomposed into product of smaller transfer functions.

   a) cascade   b) parallel   c) direct   d) cascade

10. In which method of designing IIR filter only s-plane poles map into z-plane poles?

   a) **impulse invariance**   b) bilinear transformation

   c) matched z-transformation   d) window

Multiple Choice Questions' Answer Sheet

Marks Secured: _____

In Words: _____

Examiner's Sign: _____ Date: _____

Scrutinizer's Marks: _____

In Words: _____

Scrutinizer's Sign: _____ Date: _____

Corrected Fill
Ⓐ ● Ⓒ Ⓓ

Incorrected Fill
✗ Ⓑ ⊙ ✓

1. Ⓐ Ⓑ Ⓒ Ⓓ	6. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ	7. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ	8. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ	9. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ	10. Ⓐ Ⓑ Ⓒ Ⓓ

School: SOE	Level: BE	Time: 3 Hours
Program: BEEE	Year/Part: IV/I	Full Marks: 50
Subject: **Digital Signal Processing (EG716EX)**		

✓ *Candidates are required to give their answers in their own words as far as practicable.*
✓ *The figures in the margin indicate **Full Marks**.*
✓ *Assume suitable data if necessary.*

GROUP A *(Multiple-Choice Questions in separate paper)*   **[10×1=10]**

GROUP B *(Short Answer Questions - **Attempt Any Eight**)*   **[8×2=16]**

1. Explain synthesis and analysis equation for CT periodic signal.

2. Explain linearity property of DFT.

3. Differentiate between DFT and FFT.

4. What is limit cycle oscillation? Explain.

5. Explain hanning window with mathematical expression.

6. Why we need spectral transformation? Explain.

7. How can you convert analog signal into digital signal?

8. Explain sampling rate conversion by rational factor.

9. Explain about digital filter bank.

GROUP C *(**Long** Answer Questions - **Attempt Any Six**)*   **[6×4=24]**

1. Draw block diagram of digital signal processing system and explain each block.

2. Find convolution x(n) of the signals $x_1(n) = \{1,-2,1\}$ and $x_2(n) = \{1,1,1,1,1,1\}$ using z-transform.

3. Find Fourier transform and EDS of a rectangular pulse with amplitude A and durationT.

4. Find 8-point DFT of the sequence x(n) ={1,2,3,4,5,6}using Radix-2 DIT FFT algorithm.

5. Draw cascade and direct form structure for the system

$$H(z) = (1-0.25z^{-1}+0.3z^{-2}) (1-0.5z^{-1}+0.6z^{-2})$$

6. Convert low pass Butterworth filter with system function H(z) = [0.245(1+z^{-1})]/(1-0.509z^{-1}) into BPF with upper and lower cut off frequencies w_u = 0.6π and w_l = 0.4 π. LPF has 3 dB bandwidth w_p = 0.2π.

7. Design FIR LPF with desired frequency response

$$H_d(w) = 1 \qquad -\pi/2<=w<= \pi/2$$
$$= 0 \qquad \pi/2<=w<= \pi$$

using rectangular window with N = 5.

All The Best