

205

2107063

SECTION -B (ESSAY TYPE QUESTIONS)
(5x5=25 Marks)

1. What is FIR system? What is IIR System? Also explain their difference?
2. Differentiate Time Domain & Frequency domain representation of the signals? Also discuss their significance?
3. What is called ROC? What are the various properties of ROC & explain them?
4. Explain various digital Filter design techniques
 - Bilinear Transformation Method
 - Backward Difference Method
5. Prove Energy & power Theorem?
6. Explain following
 - Re-sampling
 - Inverse Z transform
7. Discuss about multistage decimator & interpolator?
8. What are the various properties of Time variant System? Explain them with suitable example?

==END OF PAPER==

BACHELOR OF VOCATION
Automotive Mechatronics
Subject: Digital Signal Processing
Subject Code: ABEC-301
Semester: Fifth
July 2021
Theory (External): 35 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number									

SECTION -A (SHORT/OBJECTIVE TYPE QUESTIONS)

(10x1=10 Marks)

- A. Bilinear transformation is used for transforming an analog filter to digital filter:
a). TRUE
b). FALSE
- B. The system given by $y(n) = x(2n) + 2/x(n - 1)$ is:
a). Linear
b). Causal
c). Both (a) and (b)
d). None of the above
- C. The systems that employ multiple sampling rates are called multi-rate DSP systems
a). TRUE
b). FALSE
- D. The Z-transform of the function $y(n) = x(n) + y(n - 1)$ is:
a). $z/z + 1$
b). $z/2z$
c). $z/z - 1$
d). $z - 1/z$
- E. In direct form for realisation of IIR filters,
1) Denominator coefficients are the twice multipliers in the feed forward paths
2) Multipliers in the feedback paths are the positives of the denominator coefficients
3) Numerator coefficients are the multipliers in the feed forward paths
4) Multipliers in the feedback paths are the negatives of the denominator coefficients
a). 1, 2 and 3 are correct
b). 1 and 2 are correct
c). 3 and 4 are correct
d). All the four are correct

- F. The z-transform of the impulse response $y(n) = x(n) + 2x(n - 1)$ is: ²⁰⁰⁷
a). $1 + 2z^{-1}$
b). $1 + 2z^2$
c). $1 - 2z$
d). $1/2z$
- G. The function given by the equation $x(n) = 1$, for $n=0$; $x(n) = 0$, for $n \neq 0$ is a _____
a). Step function
b). Ramp function
c). Triangular function
d). Impulse function
- H. What is the ROC of $x(n) = \delta(n - k)$, $k > 0$?
a). $z = 0$
b). $z = \infty$
c). Entire z-plane, except at $z = 0$
d). Entire z-plane, except at $z = \infty$
- I. Which of the following is/are incorrect about the Cascade realization of the IIR systems?
a). It requires small amount of energy.
b). It is helpful in determining the overall transfer function.
c). The filters in the cascade are connected in parallel.
d). None of the above
- J. The Nyquist theorem for sampling
1) Relates the conditions in time domain and frequency domain
2) Does not help in quantization
3) Limits the bandwidth requirement
4) Gives the spectrum of the signal
a). 1, 2 and 3 are correct
b). 1 and 2 are correct
c). 1 and 3 are correct
d). All the four are correct