Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U3308

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

Electrical and Electronics Engineering

21EEV308 -DIGITAL SIGNAL PROCESSING SYSTEM

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1.	Determine the stability of the given system **y(n)=|x(n)|**	CO1 - U
2.	Illustrate the types of signals.	CO1 - U
3.	Find the z-transform for the sequence unit impulse function	CO2 -App
4.	Explain any two properties of Z – Transform.	CO1 - U
5.	Explain the properties of DFT.	CO1 - U
6.	Compare radix – 2 DIT and DIF FFT algorithms.	CO2 -App
7.	Realize the system function in cascade form $H(z) = \frac{1+\frac{1}{4}z^{-1}}{\left(1+\frac{1}{2}z^{-1}+\frac{1}{2}z^{-2}\right)\left(1+\frac{1}{2}z^{-2}\right)}$	CO3 -App
8.	Explain gibb's phenomenon.	CO1 - U
9.	Compare RISC and CISC processor.	CO1 - U
10.	State how spectrum meter application can be designed with digital signal processor	CO1 - U

PART – B (5 x 16= 80 Marks)

11. (a) Analyze the given systems to check whether it is CO1 - Ana (16)

(i) Static or dynamic (ii) Linear or non-linear

(iii) Time variant or time invariant

(iv) Casual or Non-causal

Y(n)= sin x(n)

Y(n)=x(2n)

Or

(b) Analyze the given signals to check whether it is periodic or aperiodic — CO1- Ana — (16)

i) $\cos(0.01\pi)n$

ii) $\cos 3\pi n$

iii) $\sin 3\pi n$

iv) $\cos\frac{2\pi n}{5} + \cos\frac{2\pi n}{7}$

12. (a) Find the Convolution for the sequence — CO2 - App — (16)

(i) X(n)={1,1↑,1}, h(n)={1,1↑,1}

(ii) X(n)={-1,1,2,-2},h(n)={0.5,1,-1,2,0.75}

Or

(b) Determine the Z transform of — CO2 -App — (16)

(i) $x(n) = \cos(\Omega_0 n)\, u(n)$

(ii) $x(n) = \sin(\Omega_0 n)\, u(n)$

13. (a) Analyze the given sequence for the number of points and compute DFT using DIT algorithm. X(n) = {4,3,2,1,-1,2,3,4} — CO3 - Ana — (16)

Or

(b) Analyze the given sequence for the number of points and obtain DFT using DIF algorithm. X(n) = {0,1,2,3,4,5,6,7} — CO3 - Ana — (16)

14. (a) Obtain direct form and cascade form realization for the transfer function of an FIR system given by — CO4 - App — (16)

$$H(Z) = (1 - \frac{1}{4}z^{-1} + \frac{3}{8}z^{-2})(1 - \frac{1}{8}z^{-1} - \frac{1}{2}z^{-2})$$

Or

(b) Realize the following using cascade and parallel form. — CO4 - App — (16)

$$H(Z) = \frac{3 + 3.6\, z^{-1} + 0.6\, Z^{-2}}{1 + 0.1\, Z^{-1} - 0.2\, Z^{-2}}$$

15. (a) Write the architectural details of DSP processor. — CO5 - U — (16)

Or

(b) Design a DSP based system for the process of Audio signals in an audio recorder system. — CO5 - U — (16)