

M. Sc DEGREE END SEMESTER EXAMINATION - OCT/NOV 2020: JAN 2021**SEMESTER 3 : PHYSICS****COURSE : 16P3PHYT12EL : INTEGRATED ELECTRONICS AND DIGITAL SIGNAL PROCESSING***(For Regular - 2019 Admission and Supplementary - 2016/2017/2018 Admissions)*

Time : Three Hours

Max. Marks: 75

PART A**Answer all (1 marks each)**

1. LC D is a
a) Passive electronic component b) Active electronic components c) Cannot be classified as active or passive d) Neutral electronic component.
2. FIR systems are
a) Recursive b) Non recursive c) both a and b d) None of these.
3. Even part of the signal can be correctly expressed as
a) $[x(n) + x(-n)]/2$ b) $[x(n) - x(-n)]/2$ c) $[x(n) + x(-n)]*2$ d) $[x(n) - x(-n)]*2$
4. The total number of real addition required for direct evaluation of DFT of all values of $X(k)$
a) $4N-2$ b) $4(N-1)$ c) $4(N-2)N$ d) $(4N-2)N$
5. Value of twiddle factor W^{15} in 8-point DFT is
a) j b) $0.707 + 0.707j$ c) $-j$ d) $-0.707 + 0.707j$

(1 x 5 = 5)**PART B****Answer any 7 (2 marks each)**

6. List four essential steps involved in fabricating a monolithic integrated circuit (IC), assuming you already have a substrate.
7. How impurities are diffused in developing ICs ?
8. What are the features of a VLSI design?
9. How are the components interconnected in an IC?
10. What is sampling?
11. Does the sum of two periodic signals be always periodic? Explain
12. Explain Causal system.
13. Mention four advantages in using digital technology?
14. Differentiate between DFT and FFT?
15. What is decimation in time FFT algorithm?

(2 x 7 = 14)**PART C****Answer any 4 (5 marks each)**

16. Why transistors are adopted for fabrication of diodes? Explain the different configurations of diode from monolithic transistors along with pin diagrams.
17. Define and plot the following continuous- and discrete-time domain functions: (a) The delta or impulse function (b) The step function (c) The ramp function (d) exponential function (e) sinusoidal function.

18. Describe the following signals
a) unit sample sequence $\delta(n)$, b) unit step signal and c) unit ramp signal.
19. Describe convolution in frequency domain in DTFT and ZT.
20. What is impulse response? Find impulse response of the following: a) $y(n) = y(n-1) + y(n-2) + x(n-1)$.
21. Draw butterfly diagram and signal flow graph for $N = 4$.

(5 x 4 = 20)

PART D

Answer any 3 (12 marks each)

- 22.1. Describe the method of incorporating resistors and capacitors into integrated circuits. Also explain what is meant by monolithic diodes?

OR

2. Describe briefly various types of integration technology. Also explain the following in detail:
a) diffusion and b) isolation methods.

- 23.1. Describe the elements of a signal processing system. Mention the advantages of digital signal processing.

OR

2. Explain how signals are classified according to their nature and characteristics in time domain.

- 24.1. Define z-transform and explain the properties of z-transform. Also find ZT of the following sequences: a) $x(n) = n^2 u(n)$ b) $x(n) = n (-1)^n u(n)$

OR

2. Describe DIT FFT? Find the DFT of a sequence $x(n) = \{1,2,3,4,4,3,2,1\}$ using DIT algorithm.

(12 x 3 = 36)