

Reg. No

Name

18P3632

MSc DEGREE END SEMESTER EXAMINATION-OCTOBER 2018

SEMESTER 3 : PHYSICS

COURSE : 16P3PHYT12EL ; INTEGRATED ELECTRONICS AND DIGITAL SIGNAL PROCESSING

(For Regular - 2017 Admission & Supplementary - 2016 Admission)

Time : Three Hours

Max. Marks: 75

Section A

Answer the following (1 marks each)

1. Unit of sheet resistance is
a) Ω b) Ω^2 c) Ω square d) Ω /square
2. Which of the following is a recursive filter?
a) IIR b) FIR c) analog filter d) both (a) and (b). e) both (a) and (c)
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 number of real multiplications required for direct evaluation of DFT of all value of $X(k)$
a) N b) N^2 c) $4N$ d) $4N^2$
5. What is the ROC for a finite two sided sequence
a) entire Z plane except $Z = \infty$ b) entire Z plane except $Z = 0$ c) entire Z plane d) None

(1 x 5 = 5)

Section B

Answer any 7 (2 marks each)

6. What is sheet resistance?
7. What is meant by a hybrid circuit?
8. Give the order of magnitude of the following: (a) the chip size; (b) the base width; (c) the diffusion temperature; and (d) the surface area of the transistor
9. Describe the photo etching process.
10. Explain Causal system.
11. Illustrate the properties of causality and time-variance with suitable examples.
12. What are the differences between regular and periodic convolutions?
13. Find the fundamental periods of the following signals if they are periodic. a) $x(n) = \cos\{2\pi/3\}n$
(b) $x(n) = \exp\{i 6 \pi n\}$
14. What do you mean by transformation?
15. What is decimation in time FFT algorithm?

(2 x 7 = 14)

Section C

Answer any 4 (5 marks each)

16. Sketch the cross section of an IC resistor. What are the order of magnitude of the smallest and the largest values of an IC resistance?
17. Why FIR systems are non recursive? Obtain the frequency impulse response of an FIR system.
18. Find the convolution of two finite duration sequences
 $h(n)=a^nU(n)$ for all n and $x(n)=b^n U(n)$ for all n , when $a= b$
19. Describe Radix 2 DIT FFT?
20. Prove the following in DFT. a) $X(k = N/2) = (-1)^n x(n)$, b) $X(-k) = X^*(k)$.
21. All the discrete time exponential signals are not periodic. Prove

(5 x 4 = 20)

Section D

Answer any 3 (12 marks each)

22. With necessary theory and schematic, describe the fabrication of a transistor in integration technology.
23. Describe briefly various types of integration technology. Also explain the following in detail: i) diffusion and ii) isolation methods.
24. Explain the classification of discrete time systems.
25. Explain how signals are classified according to their nature and characteristics in time domain.
26. Explain any five properties of Discrete Fourier Transform. Describe with examples. Also find the DTFT of the following sequences:
a) $x(n) = (1/2)^n u(-n)$ b) $x(n) = \delta(n) - \delta(n - 1)$.
27. Find the 8 point DFT of the sequence $x(n)=\{1,1,1,1,10,0,0\}$ using DIT.

(12 x 3 = 36)