

M. Sc. DEGREE (CSS) EXAMINATION, FEBRUARY 2016
THIRD SEMESTER – PHYSICS
PHY3IED: INTEGRATED ELECTRONICS & DIGITAL SIGNAL PROCESSING
(Supplementary Examination- 2014 Admission)

Time: Three Hours

Maximum Weight: 30

PART A**I. Answer any SIX questions. Each question carries a weight of 1**

1. Write down the diffusion equation and explain
2. What are the precautions to be taken when an aluminium metallization is done in a monolithic circuit?
3. Briefly explain different types of representation of DT signal
4. What is the condition for a DT exponential signal to be periodic?
5. Briefly explain CT convolution integral
6. What are the advantages of FFT over DFT?
7. How will you obtain DFT from DTFT?
8. Realise FIR filter in direct and cascade forms
9. Compare FIR and IIR filters
10. Draw the frequency response of linear symmetrical impulse response FIR filter

(6x1=6)

PART B**II. Answer any FOUR questions. Each question carries a weight of 2**

11. Explain the advantages of a schottky transistor
12. Find the output of a linear time invariant system with impulse response $h(n) = 3^n U(n)$ to an input $U(n)$
13. Explain time shifting property of Z transform, hence prove that if $X_+(z) = Z T \{x(n)\}$ then $Z T \{x(n - m)\} = Z^{-m} [X_+(z) + \sum x(-k)Z^{-k}]$
14. Find the DFT of the sequence $\{1,1,2,3\}$ using DIF algorithm
15. Explain rectangular window technique in FIR filter
16. Discuss impulse invariant technique in IIR filter design

(4x2=8)

PART C**III. Answer ALL questions. Each question carries a weight of 4**

17. a) Explain the steps involved in the fabrication of integrated circuits.

OR

- b) Explain how to convert a circuit layout to a monolithic integrated device?

18. a) Explain the representation of CT periodic signal in frequency domain.

OR

b) Discuss the classification of different DT and CT systems with examples. Check

whether the following systems are linear time invariant or not

(i) $y(n) = x(n) + \frac{1}{x(n,1)}$ and (ii) $y(n) = x(n^2)$

19. a) Explain the FFT decimation in time algorithm

OR

b) Explain the representation of DT aperiodic signal in frequency domain

20. a) Discuss approximation of derivative and bilinear transformation techniques in IIR filter design.

OR

b) Explain the Fourier series method of designing FIR filters and realization of it in direct form and cascade form

(4x4=16)