Reg. No.....Name.....

M.SC DEGREE END SEMESTER EXAMINATION OCTOBER 2016

SEMESTER – 3: PHYSICS

COURSE: P3PHYT11EL– INTEGRATED ELECTRONICS AND DIGITAL SIGNAL PROCESSING

Common for Regular (2015 Admission) & Supplementary / Improvement (2014 Admission)

Time: Three Hours Max. Marks: 75

PART A (Objective)

(Answer **all** questions. Each question carries 1 Mark)

1. Identify the three dimensional three channel signal from the list below
   a) B/W TV picture b) Color TV Picture
   c) Audio signal d) None of these.
2. A band pass signal extends from 1 KHz to 2 KHz. The minimum sampling frequency needed to retain all information in the sampled signal is
   a) 1 KHz. b) 2 KHz. c) 3 KHz. d) 4 KHz.
3. The discrete-time signal x (n) = $(-1)^n$ is periodic with fundamental period.
   a) 6 b) 4 c) 2 d) 0
4. The Fourier transform of the exponential signal $e^{j\omega_0 t}$ is
   a) a constant. b) a rectangular gate.
   c) an impulse. d) a series of impulses.
5. Given that W = $e^{\frac{2\pi j}{N}}$ where N = 3. Then F = W^N can be computed as F =
   a) 0 b) 1 c) -1 d) e

(1 x 5 = 5)

PART B (Short Answers)

(Answer **any Five** questions. Each question carries 2 Marks)

6. Distinguish between discrete time and continuous time signals.
7. Explain sample and hold circuit operation.
8. Define Energy and Power discrete time signals.
9. Explain periodic and non-periodic signals.
10. Distinguish between FIR and IIR filters.
11. Explain Causal system.
12. Define poles and zeros of a system function.
13. Distinguish between DTFT and DFT.

(2 x 5 = 10)

Part C (Problem/ Short Essays)

(Answer **any three questions**. Each question carries 4 Marks)

14. State the ten design rules for Monolithic Layout.
15. What are Hybrid Circuits?
16. Evaluate the energy and power of unit step sequence.
17. Consider an analog signal x(t) = 3cos(200πt).
    a) Determine the minimum sampling rate to avoid aliasing.
    b) Suppose the signal is sampled at the rate F_s = 150Hz, what is the discrete time signal obtained after sampling?
18. List out the properties of convolution.

(4 x 3 = 12)

Part D (Essay)

(Answer **all** questions. Each question carries 12 Marks)

19. Write an essay on fabrication of transistors in monolithic Integrated circuits.

Or

Explain the various steps of operations involved in the manufacture of Integrated circuits.

20. Draw the block schematic of the digital signal processor. Explain the function of each block.

Or

Explain the different standard signals and their representation encountered in signal processing.

Plot them in the time domain using graphical means.

21. Explain decimation in frequency Fast Fourier Transform algorithm.

Or

Explain any five properties of Discrete Fourier Transform.

22. What is bilinear transformation? What are its advantages?

Or

Explain the finite word length effects on digital signal processing.

(12 x 4 = 48)

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