16046(D)   - 0 DEC 2016

B. Tech 3rd Semester Examination

Communication Theory (NS)

EC-214

Time : 3 Hours   **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. Discuss different types of elementary signals with mathematical terms.   (20)

2. (i)   Calculate Fourier transform of
        $x(t) = e^{-at} u(t)$; $a > 0$

   (ii) Explain all the properties of Fourier transform.   (20)

SECTION - B

3. Discuss phase and group delay in detail.   (20)

4. Explain correlation of energy signals and correlation of power signals.   (20)

SECTION - C

5. Discuss different types of Noise. Explain the representation of narrowband noise in terms of envelope and phase components.
                                                        (20)

6. What do you mean by random processes? Explain Ergodic process and narrowband random process in detail.   (20)

SECTION - D

7. The joint density function of two random variable is given by

   $$f(x,y) = \begin{cases} xy/8 & ; \quad 0 < x < 4, 2 < y < 3 \\ 0 & ; \quad \text{otherwise} \end{cases}$$

   Find (a) E(x) (b) E(y)

   Explain probability density function.   (20)

8. State source coding theorem. Explain entropy and channel capacity.   (20)

SECTION - E

9. Write short notes on:

   (a) Block diagram of communication system.

   (b) Gaussian process and Gaussian distribution.

   (c) Correlation of power signals with mathematical term.

   (d) Nyquist internal and Aliasing effect.   (5×4=20)