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B. Tech (ECE) (Semester –3rd)
SIGNALS AND SYSTEMS
Subject Code: BECES1-303
Paper ID: [18111312]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Differentiate between even and odd signals.

b) Differentiate between the terms experiment and event in probability theory.

c) What is stable linear system?

d) Comment on n^{th} moment of random variable X.

e) What are the Dirichlet's condition for existence of Fourier Series.

f) What is the relation between continuous and discrete time systems.

g) Draw the spectrum of sampled signals.

h) What do mean by noise in signals?

i) Explain state-transition matrix.

j) What is Cumulative Distribution Function of random variable?

Section – B **(5 marks each)**

Q2. Check whether the given system is linear and time invariant:

$$F[x(n)] = a[x(n)]^2 + bx(n)$$

Q3. Explain Shot Noise, Flicker Noise and Partition Noise.

Q4. A box contains 3 green, 4 red and 6 white balls. One ball is drawn at random. Find the probability that the ball is (a) green, (b) not white, (c) red or green.

Q5. State and prove sampling theorem.

Q6. Explain the Complex or Exponential form of Fourier series.

Section – C **(10 marks each)**

Q7. Mention any two properties of Fourier Transform. Find the Fourier transform of Gate Function.

Q8. A 600 Ω resistor is connected across the 600 Ω antenna input of radio receiver. The bandwidth of the radio receiver is 200 kHz and the resistor is at room temperature of 27°C. Calculate the noise power and the noise voltage applied at the input of the receiver.

Q9. (a) Mention the properties of Cumulative Distribution Function.

(b) What is aliasing effect? Draw the spectrum of sampled signal showing aliasing effect.