Roll No. .....

24234

B. Tech. 5th Semester (ECE) Examination – February, 2022

COMMUNICATION ENGINEERING

Paper : EE-301-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Section. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) State convolution Theorem. 5

   (b) Discuss Entropy giving its significance in Information Theory. 5

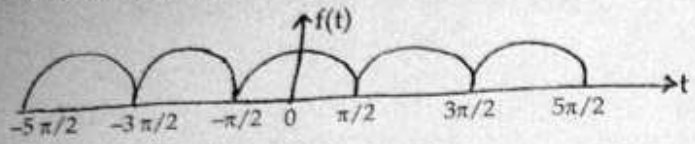
   (c) Discuss Continuous Random variables. 5

   (d) State and explain central Limit Theorem. 5

SECTION – A

2. State and prove any five properties of Fourier Transform ? 20

3. Evaluate the trignometric Fourier series expansion of a full wave rectified cosine function of time period $T = \pi$; as shown below 20



SECTION – B

4. (a) State and prove Shannon-Hortley Theorem. 10

   (b) Discuss various Entropies used in Information Theory. 10

5. Discuss Shannon-Fano coding and Huffman Coding. 20

SECTION – C

6. Describe probability distribution function, probability density function and joint probability density function in detail. 20

7. The joint density function of two continuous Random variable is : 20

$$f(x,y) = \begin{cases} Cxy : & 0 < x < 2;\ 1 < y < 3 \\ 0 \ : & \text{otherwise} \end{cases}$$

Find

(a) C

(b) $P(0 < x < 1, 1 < y < 2)$

(c) $P(x < 1; y > 2)$

(d) Marginal distribution functions of x and y.

(e) Joint Distribution function of x and y.

SECTION – D

8. What are cross Spectral Densities ? Also discuss Ergodic processes and Error function. 20

9. (a) Explain Response of Linear system to Random Signals. 10

   (b) Discuss optimum filters. 10