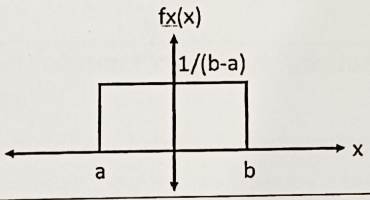
End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name: B.Tech, Semester:4
(May, 2024)

Subject Code: BEC-208	**Subject:** Communication System
Time: 3 Hours	**Maximum Marks :60**

Note:Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1			**(2.5*8=20)**	
	(a)	Plot the CDF and PDF for a Random Variable 'x' which is specifying number of heads in the experiment of tossing a coin twice.		
	(b)	Explain the relationship between Covariance and Autocovariance, and include the respective expressions for each.		
	(c)	For an amplitude modulated signal, the bandwidth is 20 KHz and the highest frequency component is 800 KHz. What is the carrier frequency used for this AM signal?		
	(d)	Draw and explain the block diagram of the Digital Communication System. Why are source encoders/decoders and channel encoders/decoders required?		
	(e)	Explain the relationship between the Frequency Modulator and Phase Modulator with the help of the block diagrams.		
	(f)	What is the use of Carson's rule in Wideband FM?		
	(g)	What is the Figure of merit? How is the receiver's efficiency determined by the Figure of merit?		
	(h)	A white noise of having 2-sided PSD 4 KW/Hz is passed through LPF, whose cut-off frequency is 2 KHz. Fine output white noise power.		
		UNIT-I		
Q2	A continuous random variable has a uniform density function as specified below. Find all its statistical averages. 		**(10)**	
Q3	What are Cumulative Probability Distribution Function (CDF) and Probability Density Function (PDF)? State the properties of CDF.		**(10)**	
		UNIT-II		
Q4	Draw the comparison chart for DSB-FC, DSB-SC, SSB-SC and VSB. Furthermore, arrange them in descending order of bandwidth and power requirements.		**(10)**	
Q5	Draw and explain the frequency domain representation of single-tone AM. Also derive the expression for total power in terms of carrier power.		**(10)**	
		UNIT-III		
Q6	Explain Narrowband FM and Wideband FM in detail. Also, draw the spectrum for each case.		**(10)**	
Q7	Draw and explain the block diagram of AM Radio Broadcasting. What do you mean by image frequency rejection? How is it done in AM radio Broadcasting?		**(10)**	
		UNIT-IV		
Q8	What is narrowband noise? Provide its expression and properties.		**(10)**	
Q9	Explain the concept of Pre-emphasis and De-emphasis in FM. Also include the circuit diagram explaining its functioning.		**(10)**	