Question Paper Code: R22A22EC02

R22

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Regular Examinations, June/July – 2024

PROBABILITY THEORY AND STOCHASTIC PROCESSES

(ELECTRONICS & COMMUNICATION ENGINEERING)

Time: 3 Hours **Max. Marks: 60**

Section – A (Short Answer type questions) (10 Marks)

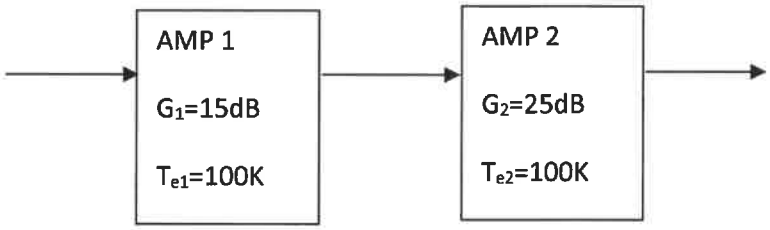
Answer All Questions		Course Outcome	B.T Level	Marks
1.	Write the probability axioms.	CO1	L2	1M
2.	What are the classifications of random variables?	CO1	L1	1M
3.	Define the skewness of the coefficient?	CO2	L1	1M
4.	Explain monotonic transformations of a random variable.	CO2	L2	1M
5.	State the Ergodic theorem.	CO3	L1	1M
6.	Give any two properties of cross correlation function.	CO3	L2	1M
7.	What is the relationship between cross correlation function and cross power density spectrum?	CO4	L1	1M
8.	What are the spectral characteristics of system response?	CO4	L1	1M
9.	Explain the Thermal noise.	CO5	L2	1M
10.	What is the Trade-off between bandwidth and SNR?	CO5	L1	1M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. (5 X 10M = 50M)

11. A)	i) State and Prove that Joint Probability and Conditional Probability. ii) Write short notes on "Poisson distribution function" and "Binomial distribution function".	CO1	L3 L2	6M 4M
	OR			
B)	A missile can be accidentally launched if two relays A and B both have failed. The probabilities of A and B failing are known to be 0.01 and 0.03, respectively. It is also known that B is more likely to fail (probability 0.06) if A has failed. i) What is the probability of an accidental missile launch? ii) What is the probability that A will fail if B has failed? iii) Are the Events 'A' fails and 'B' fails statistically independent?	CO1	L3	10M
12. A)	A random variable has a characteristic function given by $\phi_X(w) = \begin{cases} 1 - \lvert w \rvert, \lvert w \rvert \leq 1 \\ 0, \lvert w \rvert \geq 1 \end{cases}$. Find density function.	CO2	L3	10M
	OR			
B)	Distinguish between Joint Probability Distribution and Probability Density functions and their properties.	CO2	L4	10M
13. A)	List and explain various properties of cross correlation function.	CO3	L2	10M
	OR			
B)	Derive Mean and Mean squared Value of Linear System Response.	CO3	L3	10M

14. A)	State and prove that power density spectrum and their properties.	CO4	L3	10M
	OR			
B)	Find the cross-correlation function for the power spectral density is $S_{XY}(\omega)=\frac{1}{25+\omega^2}$.	CO4	L3	10M
15. A)	Find overall noise figure and equivalent input noise temperature of following figure at room temperature 27^0 C.	CO5	L3	10M



OR

B)	Explain the following terms with example. i) Shannon–Fano coding ii) Huffman coding	CO5	L2	10M