

Question Paper Code: 94024

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2021

Fourth Semester

Biomedical Engineering

19UMA424 - Probability and Inferential Statistics

(Regulation 2019)

Duration: 1:45hrs

Maximum: 50 Marks

PART A 10*2 =20 Marks

Answer any ten of the following questions

1. A discrete random variable X with probability distribution CO1-AP

X	0	1	2	3	4	5
P(X)	a	3a	5a	7a	9a	11a

Calculate the value of the constant 'a' .
2. Evaluate the Distribution from the mean and variance of binomial distribution are 5 and 4. CO1-AP
3. A random variable X follows an exponential distribution with parameter $\lambda = 1 / 5$ Calculate the value of mean . CO1-AP
4. Given X has an exponential distribution with parameter 1.Determine the pdf of $y=\sqrt{x}$? CO2-AP
5. Compute the coefficient of correlation for the following ,given The Lines of regression in a bivariate distribution are $x+9y=?$ and $y+4x=49/3$ CO2- AP
6. Let $f(x) = \frac{1}{2}$, $-1 \leq x \leq 1$ and let $y=x^2$ calculate the value of Cov (x,y) CO2-AP
- 7 Evaluate the Mean of the auto correlation function $R(\tau) = 36 + \frac{9}{1+8\tau^2}$ CO3- AP
- 8 Evaluate the autocorrelation value of the given power spectrum $S_{xx}(\omega) = \frac{4}{4+\omega^2}$, CO3- AP
- 9 Write down the Properties of Auto Correlation function CO3- AP
- 10 If $\mu_x = 0$ find μ_y CO6- U
- 11 The input of the system with impulse response $h(t) = e^{-3t} U(t)$.Evaluate The value of the system transfer function . CO4-AP
- 12 If X(t) is the white noise process ,Compute its power spectrum CO4-AP
- 13 State the condition for the Application of Chi square Test CO6-U
- 14 If $S_1^2 = 8.81$ and $S_2^2 = 15.40$ then calculate value of F- ratio test. CO5- AP
- 15 Give Two Types of errors in Testing a statistical hypothesis CO5- AP

PART B (3*10=30 Marks)
(Answer any THREE Questions)

16. Using the probability mass function of binomial distribution, Find the moment generating function of the distribution and hence find its mean and variance from moment generating function. CO1 Apply (10)
17. From the following data, Compute (i) the two regression equations (ii) The coefficient of correlation between the marks in Economics and Statistics (iii) the most likely marks in Statistics when marks in Economics are 30 CO2-Apply (10)

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

18. If the Power spectral density of a WSS processes is given by CO3-Apply (10)
- $$S(\omega) = \begin{cases} \frac{b}{a}(a - |\omega|) & ; \quad |\omega| \leq a \\ 0 & ; \quad |\omega| > a \end{cases}$$

Determine the auto correlation function of the Process.

19. Using input and output system , If X (t) is a WSS process and CO4-Apply (10)
- $$Y(t) = \int_{-\infty}^{\infty} h(u) X(t-u) du \text{ then}$$
- (i). $R_{XY}(\tau) = R_{XX}(\tau) * h(\tau)$ (ii). $R_{YY}(\tau) = R_{XX}(\tau) * h(-\tau)$
- (iii). $S_{XY}(\omega) = S_{XX}(\omega) * H(\omega)$ (iv). $S_{YY}(\omega) = S_{XX}(\omega) * |H(\omega)|^2$

20. A certain injection administered to each of 12 patients resulted in the following increases of blood pressure: 5,2,8, -1,3,0,6,-2,1,5,0,4 Analyze the data, can it be concluded that the injection will be , in general , accompanied by an increase in BP? CO5-Analyze (10)