POORNIMA INSTITUTE OF ENGINEERING & TECHNOLOGY, JAIPUR

II B.TECH. (III Sem.) **Roll No. _____**

FIRST MID TERM EXAMINATION 2022-23

Code: 3CS2-01 Category: BSC Subject Name– ADVANCED ENGINEERING MATHEMATICS

(BRANCH – COMPUTER ENGINEERING)

Max. Time: 2 hrs. **Max. Marks: 60**

NOTE:-	**Read the guidelines given with each part carefully.** **CO statement:** **1.** Apply the knowledge of probability and random variable to the real world problems. **2.** Analyze the various method of numerical solutions of Normal, Poisson and Binomial probability distribution. **3.** Formulation and solution of engineering problems in Linear programming problem. **PO Key Words:** **1.** Engineering Knowledge, **2.** Problem Analysis, **3.** Design/development of solutions, **4.** Life-long learning ***Note: Use area under the normal curve table for Question no 13.**

PART - A: (All questions are compulsory) Max. Marks (10)

	CO	PO		
Q.1	**1**	**2, 4**	The probability density function of the random variable X is given by $f(x)=\begin{cases}\frac{k}{\sqrt{x}}, & for\ 0<x\le 4\\ 0, & elsewhere\end{cases}$. Find the value of k.	**(2)**
Q.2	**1**	**2, 4**	Give statement of Chebishev's Inequality.	**(2)**
Q.3	**2**	**2, 2**	If E(X)=2, E(Y)=3, Then what value of E(2X+3Y) and E(2X+3) ?	**(2)**
Q.4	**2**	**2, 4**	Describe Binomail distribution and why it is called Binomial distribution?	**(2)**
Q.5	**3**	**1, 4**	Write a short note on History of optimization.	**(2)**

PART - B: (Attempt 4 questions out of 6) Max. Marks (20)

Q.6	**1**	**2, 4**	The first three moments of a distribution about the value 2 of a variable are 1, 16 and -40. Find mean, variance and third moment about mean.	**(5)**
Q.7	**1**	**2, 3**	A and B throw an ordinary die alternately for a stake of Rs. 11, which is to be won by one who get first 6. Find their expectations, if A has the first chance.	**(5)**
Q.8	**2**	**2, 4**	Out of 800 families with 4 children each, how many families would be expected to have (i) No Boy, (ii) at least one boy, (iii) No Girl, (iv) 2 Boys and 2 Girls. Assume equal probabilities for boys and girls.	**(5)**
Q.9		**1, 2**	Describe poisson distribution. Find mean and variance of poisson distribution?	**(5)**
Q.10	**2**	**2, 4**	Find the coefficients of correlation from following data x: 10 14 18 22 26 30 y: 18 12 24 6 30 36	**(5)**
Q.11	**3**	**3, 4**	Write brief note on classification of optimization problems.	**(5)**

PART - C: (Attempt 3 questions out of 4) Max. Marks (30)

Q.12	**1**	**2, 3**	The joint probability mass function of (x, y) is given by P(x, y)= k(2x+3y), where x= 0, 1, 2 and y=1, 2, 3. Find (i) k, (ii) Marginal probability distribution of X, (iii) Marginal probability distribution of Y, (iv) Conditional probability distribution of X given y=1.	**(10)**
Q.13	**2**	**2, 3**	The distribution of weekly wages of 500 workers in a factory is approximately normal with the mean & Standard deviation of Rs. 75 and Rs. 15 respectively. Find the no. of workers who receive weekly wages: (i) more than Rs. 90 (ii) less than Rs. 45.	**(10)**
Q.14	**2**	**2, 4**	Using the method of least squares, fit a second degree parabola to the following data: x : 0 1 2 3 4 y : 1 5 10 22 38.	**(10)**
Q.15	**3**	**2,3**	Write a short note on Optimization techniques and give five engineering applications of Optimization.	**(10)**
