



ACE
Engineering College
(with a Difference in Excellence)

An AUTONOMOUS Institution

Question Paper Code:

MA304BS

ACE-R20

Semester Supplementary Examination
II B. Tech.- I Semester- SEPTEMBER-2022
PROBABILITY AND STATISTICS
(Civil Engineering)

Time: 3 Hours


Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks																
1. a)	A continuous random variable has the probability density function $f(x) = \begin{cases} kxe^{-\lambda x}, & x \geq 0, \lambda > 0 \\ 0, & \text{otherwise} \end{cases}$ Determine (i) k (ii) Mean (iii) Variance	7																
b)	A random variable X has the following distribution <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>X=x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>P(X=x)</td> <td>k</td> <td>2k</td> <td>3k</td> <td>4k</td> <td>5k</td> <td>6k</td> </tr> </table> Find the value of k, $P(x \geq 5)$, mean and variance	X=x	1	2	3	4	5	6	P(X=x)	k	2k	3k	4k	5k	6k	7		
X=x	1	2	3	4	5	6												
P(X=x)	k	2k	3k	4k	5k	6k												
2. a)	Derive the mean and variance of Poisson distribution	7																
b)	The mean and variance of the Binomial distribution are 4 and $\frac{4}{3}$ respectively. Find $P(X \geq 1)$.	7																
3.	For a normally distributed variate with mean 1 and standard deviation 3, find the probabilities that i) $3.43 \leq X \leq 6.19$ ii) $-1.43 \leq X \leq 6.19$	14																
4.	Fit a binomial distribution to the following frequency distribution: <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>f</td> <td>13</td> <td>25</td> <td>52</td> <td>58</td> <td>32</td> <td>16</td> <td>4</td> </tr> </table>	x	0	1	2	3	4	5	6	f	13	25	52	58	32	16	4	14
x	0	1	2	3	4	5	6											
f	13	25	52	58	32	16	4											
5.	State Bayes theorem. In a referendum 60% of voters voted in favor. A random sample of 200 voters was selected. What is the probability that in the sample (i) more than 130 voted in favor (ii) between 105 and 130 inclusive voted in favor (iii) 120 voted in favor.	14																
6.	Calculate the coefficient of correlation from the following data. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>X:</td> <td>12</td> <td>9</td> <td>8</td> <td>10</td> <td>11</td> <td>13</td> <td>7</td> </tr> <tr> <td>Y:</td> <td>14</td> <td>8</td> <td>6</td> <td>9</td> <td>11</td> <td>12</td> <td>3</td> </tr> </table>	X:	12	9	8	10	11	13	7	Y:	14	8	6	9	11	12	3	14
X:	12	9	8	10	11	13	7											
Y:	14	8	6	9	11	12	3											
7. a)	The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D. 2.5 inches.	7																

7. b)	In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance.	7														
8.	<p>Calculate the regression equations of Y on X and X on Y from the following data, taking the deviations from actual means of X and Y. Estimate the likely demand when the price is Rs.20</p> <table border="1" data-bbox="271 392 1173 537"> <tr> <td>Price(X) in Rs.</td> <td>10</td> <td>12</td> <td>13</td> <td>12</td> <td>16</td> <td>15</td> </tr> <tr> <td>Amount Demanded(Y):</td> <td>40</td> <td>38</td> <td>43</td> <td>45</td> <td>37</td> <td>43</td> </tr> </table>	Price(X) in Rs.	10	12	13	12	16	15	Amount Demanded(Y):	40	38	43	45	37	43	14
Price(X) in Rs.	10	12	13	12	16	15										
Amount Demanded(Y):	40	38	43	45	37	43										



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