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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, JAN - 2023
STATISTICS FOR DATA SCIENCE
(AIDS Branch)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.	Questions	Marks	CO	KL
1	a) What do you mean by the measure of central tendency? List various measures of central tendency.	[2M]	1	
	b) Given a standard normal distribution, find the area under the curve that lies to the right of $z = 1.84$	[2M]	2	
	c) Find the value of the finite population correction factor for $n= 10$ and $N= 1000$.	[2M]	3	
	d) Define Type-1 and Type-2 errors.	[2M]	4	
	e) Write Normal equations to fit the second-degree parabola.	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.	Questions	Marks	CO	KL																		
<u>UNIT-I</u>																						
2.	a) A random variable x has the following distribution function. <table border="1" style="margin: 10px 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> <td>7</td> </tr> <tr> <td>y</td> <td>0</td> <td>k</td> <td>$2k$</td> <td>$2k$</td> <td>$3k$</td> <td>k^2</td> <td>$2k^2$</td> <td>$7k^2 + k$</td> </tr> </table> i) find the value of k ii) $P(x < 6)$ iii) $P(0 < x < 5)$ iv) Cumulative distribution function $F(x)$	x	0	1	2	3	4	5	6	7	y	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$	[5M]	1	
x	0	1	2	3	4	5	6	7														
y	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$														
	b) Derive mean and variance of Binomial distribution.	[5M]	1																			
OR																						
3.	a) A sample of 3 items are selected at random from a box containing 10 items out of which 4 are defective. Find the expected number of defective items.	[5M]	1																			
	b) The following tables gives a number of days in a 50 – day period during which automobile accidents occurred in a city Fit a Poisson distribution to the data : <table border="1" style="margin: 10px auto;"> <tr> <td>No. of accidents</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>No. of days</td> <td>21</td> <td>18</td> <td>7</td> <td>3</td> <td>1</td> </tr> </table>	No. of accidents	0	1	2	3	4	No. of days	21	18	7	3	1	[5M]	1							
No. of accidents	0	1	2	3	4																	
No. of days	21	18	7	3	1																	
<u>UNIT-II</u>																						
4.	Explain Normal and standard Normal distributions. Find the probabilities that a random variable having the standard normal distribution will take on a value i) between 0.87 and 1.28 ii) between $- 0.87$ and 0.62 iii) greater than 0.85 iv) greater than $- 0.65$	[10M]	2																			
OR																						
5.	The diameter of the electric cable say x is assumed to be a continuous random variable with probability density function, $f(x) = 6x(1 - x)$, $0 \leq x \leq 1$. Check that cable is probability density function also find mean and variance.	[5M]	2																			
<u>UNIT-III</u>																						

6.		A population consists of five numbers 2,3,6,8 and 11. Consider all possible samples of size two which can be drawn with replacement from this population .Find a) The mean of the population b) The standard deviation of the population c) The mean of the sampling distribution of means and d) The standard deviation of the sampling distribution of means	[10M]	3																							
OR																											
7.	a)	What is the effect on standard error, if a sample is taken from an infinite population of sample size is increased from 400 to 900?	[5M]	3																							
	b)	The mean height of students in a college is 155 cm and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157 cm?	[5M]	3																							
UNIT-IV																											
8.	a)	A sample of 900 members has a mean of 3.4 cms and S.D. 2.61 cms. Is this sample has been taken from a large population of mean 3.25 cms and S.D. 2.61 cms. If the population is normal and its mean is unknown find the 95% confidence limits of true mean.	[5M]	4																							
	b)	A sample analysis of the examination results of 500 students was made. It was found that 220 students had failed, 170 had secured a third class, 90 were placed in a second class and 20 got a first class. Do these figures commensurate with the general examination result which is in the ratio of 4 : 3 : 2 : 1 for the various categories respectively?	[5M]	4																							
OR																											
9.	a)	In a survey of buying habits, 400 women shoppers are chosen at random from super market A located in a certain section of the city. Their average weekly food expenditure is Rs 250 www.Jntufastupdates.com 5 with a S.D. of Rs. 40. For 400 women shoppers were chosen at random in supermarket B in another section of the city, the average weekly food expenditure is Rs. 220 with a S.D. of Rs. 55. Test at 1% level of significance whether the average weekly food expenditure of the two populations of shoppers are equal.	[5M]	4																							
	b)	Four coins were tossed 160 times and the 0, 1, 2, 3, and 4 results were obtained 17, 52,54, 31 and 6 times. Under the assumption that coins are balanced, find the expected frequencies of 0, 1, 2, 3 or 4 heads, and test the goodness of fit at a level of significance 0.05.	[5M]	4																							
UNIT-V																											
10.	a)	Fit an exponential curve of the form $y = ab^x$ to the following data: <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>y</td> <td>1.0</td> <td>1.2</td> <td>1.8</td> <td>2.5</td> <td>3.</td> <td>4.7</td> <td>6.6</td> <td>9.1</td> </tr> </tbody> </table>	x	1	2	3	4	5	6	7	8	y	1.0	1.2	1.8	2.5	3.	4.7	6.6	9.1	[5M]	5					
x	1	2	3	4	5	6	7	8																			
y	1.0	1.2	1.8	2.5	3.	4.7	6.6	9.1																			
	b)	Calculate correlation coefficient to the following data: <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>X</td> <td>10</td> <td>15</td> <td>12</td> <td>17</td> <td>13</td> <td>16</td> <td>24</td> <td>14</td> <td>22</td> <td>20</td> </tr> <tr> <td>y</td> <td>30</td> <td>42</td> <td>45</td> <td>46</td> <td>33</td> <td>34</td> <td>40</td> <td>35</td> <td>39</td> <td>38</td> </tr> </tbody> </table>	X	10	15	12	17	13	16	24	14	22	20	y	30	42	45	46	33	34	40	35	39	38	[5M]	5	
X	10	15	12	17	13	16	24	14	22	20																	
y	30	42	45	46	33	34	40	35	39	38																	
OR																											
11.	a)	Fit the curve of the form $y = ae^{bx}$ to the following data: <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>X</td> <td>77</td> <td>100</td> <td>185</td> <td>239</td> <td>285</td> </tr> <tr> <td>y</td> <td>2.4</td> <td>3.4</td> <td>7.0</td> <td>11.1</td> <td>19.6</td> </tr> </tbody> </table>	X	77	100	185	239	285	y	2.4	3.4	7.0	11.1	19.6	[5M]	5											
X	77	100	185	239	285																						
y	2.4	3.4	7.0	11.1	19.6																						
	b)	Calculate rank correlation to the following data: <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>X</td> <td>68</td> <td>64</td> <td>75</td> <td>50</td> <td>64</td> <td>80</td> <td>75</td> <td>40</td> <td>55</td> <td>64</td> </tr> <tr> <td>y</td> <td>62</td> <td>58</td> <td>68</td> <td>45</td> <td>81</td> <td>60</td> <td>68</td> <td>48</td> <td>50</td> <td>70</td> </tr> </tbody> </table>	X	68	64	75	50	64	80	75	40	55	64	y	62	58	68	45	81	60	68	48	50	70	[5M]	5	
X	68	64	75	50	64	80	75	40	55	64																	
y	62	58	68	45	81	60	68	48	50	70																	
