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**S.E. (Artificial Intelligence & Data Science)**  
**Statistics-Unit test II (Div A)**

*Instructions to candidates:*

- 1) Answer Q.1 or Q.2, Q.3 or Q.4
- 2) Figures to the right indicate full marks.

Q 1 )	a)	The First four moments of a distribution about the value 4 are 2, 20, 40 and 100.from the given information obtain the first four central moments ,coefficient of skewness and kurtosis.								[5]		
	b)	Obtain the regression lines $y$ on $x$ and $x$ on $y$ for the data								[5]		
		x	40	44	28	30	44	38	31			
		y	32	39	26	30	38	34	28			
	c)	Calculate standard deviation for the following frequency distribution. Decide whether Arithmetic mean is good or not.								[5]		
		Wages in rupees earned per day		0-10	10-20	20-30	30-40	40-50	50-60			
		No of laborer's		5	9	15	12	10	3			
		OR										
Q 2 )	a)	Following are the values of import of raw material and export of finished product in suitable units								[5]		
		Export	10	11	14	14	20	22	16	12	15	13
		Import	12	14	15	16	21	26	21	15	16	14
		Calculate the coefficient of Correlation between the import values and export values.										
	b)	If the two lines of regression are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ Find a) the means of $x$ and $y$ b) find the values of the correlation coefficient between $x$ and $y$ .								[5]		
	c)	Compute the first four moments about arbitrary mean $A=25$ for the following frequencies								[5]		
		No of Jobs		0-10	10-20	20-30	30-40	40-50				
		No of Workers		6	26	47	15	6				
Q 3 )	a)	10% of bolts produced by a machine are defective. Determine the probability that out of 10 bolts chosen at a random (i) 1 is defective (ii) two are defective (iii) at most 2 bolts are defective.								[5]		
	b)	A firm produces article, 0.1% of which are defective. If packs them in cases containing 500 article. If a wholeseller purchases 100 such cases, how many cases can be expected i) to be free from defective ii) to have one defective								[5]		
	c)	For a normal distribution When mean= 2, standard deviation $\sigma = 4$ , find the probabilities of the following intervals  (i) $4.43 \leq x \leq 7.29$ (ii) $- 0.43 \leq x \leq 5.39$								[5]		

		[Given: $A(z = 0.61) = 0.2291$ , $A(z = 1.32) = 0.4066$ , $A(z = 0.85) = 0.3023$ ]						
		<b>OR</b>						
<b>Q 4 )</b>	<b>a)</b>	A Random variable X with following probability distribution						<b>[5]</b>
		$X$	0	1	2	3	4	
		$P(X)$	0.1	$k$	$2k$	$2k$	$k$	
		Find (i) $k$ (ii) $P(x < 2)$ (iii) $P(x \geq 3)$ (iii) $P(1 \leq x \leq 3)$						
	<b>b)</b>	Fit a Poisson Distribution to the following data and calculate theoretical frequencies						<b>[5]</b>
$x$		0	1	2	3	4	Total	
$f$		109	65	22	3	1	200	
	<b>c)</b>	In a sample of 1000 cases the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal to be find						<b>[5]</b>
i) How many students score between 12 and 15								
ii) How many score below 8								
( Given: $A(z = -0.8) = 0.2881$ , $A(z = 0.4) = 0.1554$ $A(z = 2.4) = 0.4918$ )								