Reginate Star (Incorcular Questions).

- निदर्शन तथा गैर निदर्शन विभ्रम में अन्तर कीजिए।
 - Distinguish between Sampling and non-sampling error. निदर्शन बंटन से क्या अभिप्राय है ?
- 1नदशन बटन स क्या आमत्राय ह ? What is meant by Sampling Distribution ? (Univ. of Raj., 2008)
 परिमित संशोधन कारक किसे कहते हैं ?
- पारामत संशाधन कारक किस कहत ह ? What is Finite Correction Factor ?
 प्रमाप विभ्रम की उपयोगिता समझाइए ।
- 4. प्रमाप विभ्रम का उपयागिता समझाइए। Explain the utility of standard error.
- 'किसी प्रतिदर्श सर्वेक्षण में विभ्रम के अनेक स्रोत होते हैं। एक पूर्ण रूप से यथार्थ सर्वेक्षण कल्पना मात्र है।' इस कथन का विवेचन कीजिए।
 'In any sample survey, there are many sources of error. A
 - perfect survey is a myth.' Discuss this statement.

Two - random sample have been drawn from a universe having Rs. 40 as weekly standard deviation of wages. Find out -

- i) Is average income of first sample significantly different from the combined average income?
- ii) Is average income of second sample significantly different from the combined average income? Sample 1 No. = 800, Average weekly income = Rs. 500

Sample 2 No. = 1200, Average weekly income = Rs. 450

रू. 40 साप्ताहिक मजदूरी प्रमाप विचलन वाले एक समग्र से दो दैव प्रतिदर्श निकाले गये यह ज्ञात करें (1.) क्या प्रथम प्रतिदर्श की औसत आय का दोनों प्रतिदर्शों की सामूहिक माध्य आय से सार्थक अंतर है? (2.) क्या द्वितीय प्रतिदर्शों की औसत आय का दोनों प्रतिदर्शों की सामूहिक माध्य आय से सार्थक अंतर है?

प्रतिदर्श 2 No. = 1200, औसत साप्ताहिक आय = रू. 450 $(Z = \pm 1.96)$ (value of Z टेस्ट ± 1.96) Distinguish between the following : निम्न में अन्तर स्पष्ट कीजिए :

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- (i) Parameter and Statistic प्राचल एवं प्रतिदर्शज
- (ii) Probability and Non-probability sampling प्रायिकता आधारित एवं प्रायकिता अ-आधारित प्रतिचयन
- (iii) Census Method and Sampling Method संगणना विधि एवं प्रतिचयन विधि



A random sample of 100 primary schools was taken and the average of students studying in the schools was found to be 480. In an another sample of 150 schools the average of the students was found to be 490. If the standard deviation of population a 10, then show whether the mean of first sample differ significantly from combined mean of the samples ?

Club



S-11 - 2.75

It is claimed that a random sample of 100 tyres with a mean life of 15269 km. is drawn from a population of tyres which has a mean life of 15,200 Km. and a standard deviation of 1248 km. Test the validity of this claim.



- समझाइए किस प्रकार काई-वर्ग बंटन का प्रयोग काल्पनिक एवं अवलोकित बंटन की तुलना के लिए किया जाता है ? विभिन्न परिस्थितियों में स्वातन्त्र्य संख्या किस प्रकार ज्ञात की जा सकती है ?
 - Explain how the χ^2 distribution can be used for judging the agreement between a hypothetical and an observed distribution? Show how the degrees of freedom are determined in different circumstances.
- . 'काई-वर्ग' परीक्षण के विभिन्न उपयोगों का वर्णन कीजिए।

Describe the various uses of the 'Chi-Square' Test ?

- 3. आसंजन-उत्कृष्टता की काई-वर्ग जाँच क्या है? इस जाँच का उपयोग करते समय कौन-सी सावधानियाँ लेनी आवश्यक हैं? What is the Chi-square (x²) test of goodness of fit? What precautions are necessary in using this test?
- I. 'काई-वर्ग' बंटन के विशेष गुणों की उदाहरण सहित व्याख्या कीजिए। काई-वर्ग जाँच के प्रयोग की आवश्यक शर्तों का भी वर्णन कीजिए। Explain, with illustration, the special properties of Chi-square

distribution. Also state the necessary conditions for applying the χ^2 -test. (Univ. of Rajasthan, 2011)

- तिम्न पर संक्षिप्त टिप्पणी लिखिए—
 Write short notes on the following –
 (i) स्वातन्त्र्य संख्या (Degrees of Freedom)
 (ii) शून्य परिकल्पना (Null Hypothesis)
 (iii) येट के संशोधन (Yate's corrections)
 - (iv) अन्वायोजन-उत्कृष्टता की जाँच (Test of Goodness of Fit)

The following values of χ^2 are obtained in a survey made by 8 investigators about vaccination and attack from small-pox :

Investigator :	1	2	3	4	5	6	7	8
Value of χ^2	3.57	3.61	2.05	4.45	2.16	3.68	4.85	6.23
d.f	1	1	1	1	1	1	1	1
Find the polled χ^2 value and conclusion at 5% level of significance.								

Salut

The following table shows the condition of home and the condition of child.

Condition of	Condition of Child						
Home	Clean	Fairly Clean	Dirtý	Total			
Clean	76	38	25	139			
Not Clean	43	17	47	107			
Total	119	55	72	246			

Do these results suggest that the condition of the home affects the condition ^{of child?} (At 5% level of significance, the value of $\chi^2 = 5.991$ for 2 df.)

LICIUM 40 .

192 families (for each of which the possibility of an albino child being born is otherwise established) had the following distribution of albinos among the first



Illustration 26 :

A skilled typist on routine work, kept a record of mistakes per day during 300 working days. The data are given below :

Mistakes per day	0	1	2	3	4	5	6	Total
Number of days	143	90	42	12	9	3	1	300
Frequencies under Poisson Distribution	123	1 10	49	14	3	1	9.4	300

Does the Poisson Distribution give a good fit?

Ascertain control limits for the following with the help of facts given below :

निम्न तथ्यों की सहायता से निम्नलिखित के लिए नियंत्रण सीमाएँ ज्ञात कीजिए।

(a) \bar{x} Chart / माध्य नियंत्रण चार्ट

(b) R Chart / विस्तार चार्ट

S No of	Measurement of Items (cm)						
Samples	1	2	3	4	5		
1	50	55	52	49	54		
2	51	50	53	50	46		
3	50	53	48	52	47		
4	48	53	50	51	53		
5	46	50	44	48	47		
6	55	51	56	47	51		
7	45	48	53	48	51		
8	50	56	54	53	57		
9	47	53	49	52	54		
10	56	53	55	54	52		

If n = 5, $A_1 = 1.60$, $A_2 = 0.58$, $D_4 = 2.115$, $D_3 = 0$

यदि n = 5, $A_1 = 1.60$, $A_2 = 0.58$, $D_4 = 2.115$, $D_3 = 0$



Ę	Salesman						
· Territory	А	В	С	D	Total		
X	5	4	4	7	20		
Y	7	8	5	4	24		
Z	9	6	6	7	28		
Total	21	18	15	18	72		

निम्नलिखित सारणी में चार विक्रयता की तीन विभिन्न प्रकार के क्षेत्र में औसत माह विक्रय दी गई है। क्या चारो कि विक्रयताओं की औसत विक्रय में सार्थक अंतर है।

F at 5% level of significant for (3,6) d.f. = 4.76 and for (2,6) d.f. = 5.14

F का सारणी मूल्य 5% सार्थकता स्तर पर (3,6) d.f. = 4.76 and (2,6) d.f. = 5.14 है।

(OR)

अग्रांकित 10 प्रतिदर्शो में माध्य चार्ट तथा विस्तार चार्ट तैयार करें — यदि प्रमाप विचलन σ = 2.19 हो :

Prepare \bar{x} chart and R chart from the following 10 samples when standard deviation of universe (σ) is 2.19.

	value of Units						
Sample No.	1	2	3	4	5		
1	2	5	4	8	6		
2	4	3	7	3	8		
3	5	1	3	5	6		
4	2	3	4	5	1		
5	2	9	7	5	6		
6	7	6	4	3	5		
7	6	5	9	8	4		
8	5	8	2	6	6 4		
9	7	3	8	6	6		
10	5	4	3		5		

n(5) के लिए $D_1 = 0$ तथा $D_2 = 4.918$ सारणी मान है। The table value for n = 5 are $D_1 = 0$ and $D_2 = 4.918$

Three varieties A, B and C of a crop are tested in a randomised block design with four replications, the layout being given in the following table the plot yield in kg. are also indicted therein. Analyse the experimental yield and state your conclusion :

 A
 6
 C
 5
 A
 8
 B
 9

 C
 8
 A
 4
 B
 6
 C
 9

 B
 6
 B
 7
 C
 10
 A
 6

Three varieties of rice are tested in a completely randomised block design with four replications. The plot yield in quintals are as follows :



Carry out the experimental yield and give your conclusion. $tion \cdot$

A particular manure is experimented on four plots A, B, C and D. Each plot divided in five beds and manure used. The following are the data of yields. Find out if the variety differences are significant or not? Use values of F at 5% level of significance. (Given : $F_{0.50}$ 3, 16 = 3.24)

Plot Yield					
)					
j.					

The following data represent the number of units of production per day turned out by 5 different workers using 4 different types of machines.

	Machine type					
Workers	А	В	С	D		
1	44	38	47	36		
2	46	40	52	43		
3	34	36	44	32		
4	43	38	46	33		
5	38	42	49	39		

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- (a) Test whether the mean productivity is the same for the different machine types.
- (b) Test whether the 5 workers differ with respect to mean productivity.

S-II - 5.48

Analysis of Variance

21. Analyse the	following results			
Columns	1	2	3	4
Rows 1 2 3 4	A (12) D (18) B (12) C (16)	D (20) A (14) C (15) B (11)	C (16) B (11) D (19) A (15)	B (10) C (14) A (13) D (20)

following results of a Latin square experiment :

The letters A, B, C, D denote the treatments and the figures in the brackets [Madras Univ., B.A., 1978] denote the observations.

[Ans. F = 44.476 Variations significant]

22. Four varieties of certain vegetables are planted each on five plots of land of the same size and type and each variety is treated with five different fertilizers. The yields are as follows :

	Fertilizer					
Variety	1	2	3	4	5	
1	4.9	5.2	5.6	48	5.1	
2	5.5	4.9	5.3	5.6	5.2	
3	4.7	4.9	5.2	5.0	5.1	
4	5.1	4.8	5.5	5.3	5.4	

Show whether there is evidence that any difference exists between the yields of varieties independently of the first any difference exists between the yields of varieties independently of the fertilizer and any differential effect is exerted by the fertilizer independently of the by the fertilizer independently of the variety.

To test the significance of the variation of the retail prices of a commodity three principal cities – Mumbai, Kolkata and Delhi, four shops were chosen at random in each city and prices observed in Rs. were as follows :

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M. 1 ·				
Mumbai Kolkata	16 14	8	12	14
Delhi	14	10	10	6
	4	10	8	8

Do the data indicate that the prices in the three cities are significantly differing

[M.Com., Delhi Univ., 1984

[Ans.: F = 2.62, Prices in the three cities are not significantly different 15. The following table gives monthly sales (in thousand Rs.) of a certain im three states by its four salesmen :

