

Class : 12

Register  
Number

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## QUARTERLY COMMON EXAMINATION - 2023

## STATISTICS

Time Allowed : 3.00 Hours]

[Max. Marks : 70

## Part - I

Note : i). Answer all the questions

15x1=15

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer

- In general large Sample theory is applicable when  
(a)  $n \geq 100$  (b)  $n \geq 50$  (c)  $n \geq 40$  (d)  $n \geq 30$
- Critical value at 5% level of significance for two tailed large sample test is  
(a) 1.645 (b) 2.33 (c) 2.58 (d) 1.96
- What is the rejection rule, based on large sample, for testing  $H_0$  against one - sided (left) alternative hypothesis?  
(a)  $|Z_0| \geq Z_{\alpha/2}$  (b)  $Z_0 < -Z_{\alpha}$  (c)  $Z_0 \leq -Z_{\alpha/2}$  (d)  $Z_0 > Z_{\alpha}$
- Students 't' distribution was found by  
(a) Karl Pearson (b) Laplace (c) R.A.Fisher (d) William S.Gosset
- If the order of the contingency table is (5x4). Then the degree of freedom of the corresponding Chi - Square test statistic is (a) 18 (b) 17 (c) 12 (d) 25
- The statistic  $\lambda^2$ , with usual notations, in case of contingency table of order (m x n) is given by  
(a)  $\lambda_o^2 = \sum_{i=1}^m \sum_{j=1}^n \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$  (b)  $\lambda_o^2 = \sum_{i=1}^K \frac{(O_i - E_i)^2}{E_i}$  (c)  $\lambda_o^2 = \sum_{i=1}^K \frac{(O_i - E_i)}{E_i}$  (d)  $\lambda_o^2 = \sum_{i=1}^K \frac{O_i}{E_i}$
- In One - way classification the total variation can be split into  
(a) Two components (b) Three components (c) Four components (d) only one components
- The formula for comparing three or more means in one - way analysis of variance is  
(a)  $F = \frac{MST}{MSE}$  (b)  $F = \frac{TSS}{SST}$  (c)  $F = \frac{MSB}{MST}$  (d)  $F = \frac{MST}{MSB}$
- If the calculated value of F is greater than the critical value at the given - level of significance then the  $H_0$  is (a) Rejected (b) Not rejected (c) Always true (d) Sometime true
- If the two variables do not have linear relationship between them they are said to have  
(a) Positive correlation (b) Negative Correlation (c) Un Correlation (d) Spurious Correlation
- If  $\Sigma D^2 = 0$ , rank correlation is  
(a) 0 (b) 1 (c) 0.5 (d) -1
- If  $r = 0$  the Cor (x,y) is  
(a) 0 (b) +1 (c) -1 (d)  $\alpha$
- is widely used for Prediction  
(a) regression analysis (b) Correlation analysis  
(c) Analysis of variance (d) Analysis of Covariance
- is the Father of Mental test  
(a) R.A.Fisher (b) Croxton and Cowden (c) Francis Galton (d) A.L.Bowley
- If  $b_{xy} = 0.7$  and 'a' = 8 then the regression equation of x on y is  
(a)  $Y = 8 + 0.7 x$  (b)  $X = 8 + 0.7 Y$  (c)  $Y = 0.7 + 8x$  (d)  $X = 0.7 + 8Y$

## PART - II

II. Answer any six Questions.

6x2=12

- What is Inferential Statistics?
- What is Null Hypothesis?
- When paired t - test can be applied?
- Define chi - Square Statistic.
- Define : Between Group Variance and within Group Variance.
- What are the components in a two - way ANOVA?
- What are the different types of Correlation?
- What is Scatter Diagram?
- Find the Standard deviation of Y given that  $V(x)$  is 36,  $b_{xy} = 0.8$ ,  $r_{xy} = 0.5$

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## PART - III

## III. Answer any six questions.

6x3=18

25. Explain Critical Value.
26. State the Properties of  $\lambda^2$  distribution.
27. Give the test statistic for 2 x 2 contingency tables.
28. What are the merits and demerits of one - way classification?
29. Write down any 3 properties of Correlation?
30. Test the consistency of the following data with the symbols having their usual meaning  $N = 1000$ ,  $(A) = 600$ ,  $(B) = 500$ ,  $(AB) = 50$ .
31. Write any three uses of regression.
32. Given the following lines of regression  $8x - 10y + 66 = 0$ ,  $40x - 18y = 214$ . Find the mean values of X and Y.
33. In test for Population Proportion It  $n = 500$  and  $np = 383$  then calculate the value of the test statistic under  $H_0 : P = 0.68$

## PART - IV

## Note : Answer all the following questions.

5x5=25

34. (a) The mean breaking strength of cables supplied by a manufacturer in 1900  $n/m^2$  with a standard deviation of 120  $n/m^2$ . The manufacturer introduced a new technique in the manufacturing process and claimed that the breaking strength of the cable has increased. In order to test the claim, a sample of 60 cables is tested. It is found that the mean breaking strength of the sampled cables is 1960  $n/m^2$ . Can we support the claim at 1% level of significance? **OR**
- (b) Preference of school students, who participate in sports events, to do physical exercises in Modern gymnasium rather than doing a aerobic exercises was analyzed. The number of students randomly selected from two states and their preference for modern Gymnasium are give below.

State	No of Students	
	Sample	Preferred Modern Gymnasium
A	50	38
B	60	52

Test whether the difference between Proportion of school students who prefer modern gymnasium to do their exercises in the two states in Significant at 5% level of significance.

35. (a) A company gave an intensive training to its salesman to increase the sales. A random sample of 10 salesman was selected and the value (in laksh of Rupees) of their sales per month, made before and after the training is recorded in the following table. Test whether there is any increase in mean sales at 5% level of significance. **OR**
- (b) The weight (in kg) of 10 students from a school are 38, 40, 45, 53, 47, 43, 55, 48, 52, 49. Can we say the variance of distribution of weights of all students from the above school is equal to 20 kg?
36. (a) The following table gives the random sample of marks scored by students in two schools A and B

School A	63	72	80	60	85	83	70	72	81
School B	86	93	64	82	81	75	86	63	63

is the variance of the marks of students in school A is less than that of those in school B? Test at 5% level of significance. **OR**

- (b) A test was given to five students taken at random from XII class of three schools of a town. The individual scores are

School I	9	7	6	5	8
School II	7	4	5	4	5
School III	6	5	6	7	6

Carry out the one - way ANOVA.

37. (a) The following are the marks scored by 7 students in two tests in a subject. Calculate coefficient of correlation from the following data and interpret.

Mark in test 1	12	9	8	10	11	13	7
Mark in test 2	14	8	6	9	11	12	3

**OR**

- (b) Can Vaccination be regarded as a preventive measure of Hepatitis B from the data given below. of 1500 persons in a locality, 400 were attacked by Hepatitis B. 750 has been VAcinated. among them only 75 were attacked.

38. (a) Distinguish between Correlation and Regression. **OR**

- (b) Find the Linear regression equation of percentage worms (Y) on size of the crop (x) based on the following 7 observations.

Size of the Crop(x)	16	15	11	27	39	22	20
Percentage worms (Y)	24	25	34	40	35	20	23

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