

NG-141

November-2018

B.Com., Sem.-V

CE-302(B) : Advanced Statistics – VIII

[Time : 2:30 Hours]

[Max. Marks : 70]

- Instructions : (1) Figures to the right indicate the full marks of that question.
 (2) Use of simple calculator is allowed.

- (A) (i) Give properties and uses of t-distribution. 7
 (ii) Two horses A and B were tested for running a particular track. The time taken by them are given below : 7

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

Can it be concluded that Horse A is faster than Horse B ? [$t_{0.05} = 1.80$]

OR

- (i) Explain paired t-test and state the assumptions of t-distribution. 7
 (ii) Two random samples of sizes 9 and 7 respectively are drawn from two different populations. The means of the samples are 196.4 and 198.8 respectively. The sum of the square of deviations from their respective means are 26.94 and 18.73. Test the hypothesis that population means are equal. [$t_{0.05} = 2.145$] 7
- (B) Answer the following questions : (any three) 3
- (i) State the probability density function of t-distribution.
 (ii) Who had found t-distribution and when ?
 (iii) Define degree of freedom.
 (iv) Give the definition of t-distribution.

2. (A) (i) Explain the uses of χ^2 distribution.
(ii) Fit a Poisson distribution and test the goodness of fit.

Number of Mistakes	0	1	2	3	4	5	6
Number of Pages	11	31	26	17	10	4	1

$$[\chi_{0.05}^2 = 7.82]$$

$$[e^{-m} = 0.1353]$$

OR

- (i) Explain Yate's correction for a 2×2 table.
(ii) For 2×2 contingency table

x	10
10	x

$$\chi^2 = \frac{20}{3} \text{ find the value of } x.$$

(B) Answer the following questions : (any three)

- (i) State the probability density function of χ^2 distribution.
(ii) State the formula of χ^2 for 2×2 contingency table.
(iii) Give any two limitations of χ^2 test.
(iv) State mean and variance of χ^2 distribution.

3. (A) (i) Explain the technique of one-way analysis of variance.
(ii) Prepare a two-way ANOVA for the data below :

Operators	Machines			
	I	II	III	IV
A	38	40	41	39
B	45	42	49	36
C	40	38	42	42

coded data can be obtained by subtracting common number 40.

$$[F_{(3,6)} = 4.76 \text{ and } F_{(2,6)} = 5.14]$$

OR

- (i) Explain the technique of two-way analysis of variance. 7
- (ii) Prepare one-way ANOVA table for the following and give your comment. 7

A	36	37	39	32	36
B	34	33	33	41	31
C	41	44	38	44	48

use coding method subtracting 30 from each data value.

$$[F_{0.01}(2, 12) = 6.93 \text{ or } F_{0.01}(12, 2) = 99.42]$$

(B) Answer the following questions : (any two) 4

- (i) State two assumptions of analysis of variance.
- (ii) State the principles of design of experiment.
- (iii) If $\Sigma(x_1 - \bar{x}_1)^2 = 24$, $\Sigma(x_2 - \bar{x}_2)^2 = 22$, $n_1 = 5$, $n_2 = 7$, then find F.

(A) (i) With reference to non-parametric test, explain Wilcoxon test. 7

- (ii) Number of accidents on three different roads of a city during 10 days are given below : 7

Road A	6	4	5	7	8	6	9	11	10	9
Road B	2	6	3	2	10	7	11	12	4	3
Road C	4	5	8	7	2	11	15	10	8	5

$$[Z_{0.05} = 1.96]$$

On the basis of above information it can be said that accidents occurring on all the three ways are same in average.

OR

- (i) Explain Kolmogorov non-parametric test.
- (ii) Verify that the following two samples are drawn from same population or not.

[Use Mann-Whitney Test]

Sample - I	17	19	18	5	12	28	17	16	24	36	40
Sample - II	15	19	25	30	15	8	14	16	20	25	30

$$[Z_{0.05} = 1.96]$$

(B) Answer the following question : (any two)

- (i) Give four important differences between parametric and non-parametric tests.
 - (ii) State the calculations formula for sign test.
 - (iii) State the calculations formula for median test.
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