Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2024-25

Class:	TE	**Semester:**	V
Course Code:		**Course Name:**	Stats

Name of Student:	Sainath Khot
Roll No. :	20
Assignment No.:	5
Title of Assignment:	
Date of Submission:	
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	
Demonstrated Knowledge	3	
Legibility	2	
Total	10	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty :

Signature :

Date :

Assignment 5

Q.1

Group of people	Haloperidol X	Y	Z
A	25	7	13
	27	8	18
B	21	16	19
	24	11	14
C	29	19	30
	31	21	27

(1) Correction factor $= \frac{(T)^2}{n}$

$= \frac{(360)^2}{18}$

$= 7200$

(2) Sum of squared total (SST) =

Σx_{ij}^2 − Correction factor

$= 8144 - 7200$

$= 944$

(3) Sum of squared between column (SSBc)

$= \frac{\Sigma x_{ij}^2}{n_j}$ − correction factor

$= \left[\frac{157 \times 157}{6} + \frac{82 \times 82}{6} + \frac{121 \times 121}{6} \right] - 7200$

$= 469$

(3) Sum of squared between Rows (SSBr)

$= \frac{(\Sigma x_i)^2}{n_i} - \text{correction factor}$

$= \left[\frac{98 \times 98}{6} + \frac{105 \times 105}{6} + \frac{157 \times 157}{6} \right] - 7704$

$= 346.33$

(4) Sum of squared within (SSW)

$= \Sigma (x_{ij} - \bar{x})^2 + \Sigma (x_{ij} - \bar{x})^2$

$= [(25-26)^2 + (27-26)^2 + (2.5-7)^2 + (7.5-8)^2$
$+ (15.5-13) + (15.5-18)^2 + (27.5-21)^2 + (22.5-24)^2$
$+ (13.5-16)^2 + (13.5-11)^2 + (16.5-19)^2 + (16.5-14)^2 +$
$(30-29)^2 + (30-31)^2 + (20-19)^2 + (20-21)^2 + (30-28.5)^2$
$+ (27-28.5)^2]$
$= 53$

(5) Sum of squared interaction (SSI)

$= SST - [SSBc + SSBr + SSW]$
$= 944 - [469 + 346.33 + 53]$
$= 75.67$

DOF :-

$SSBc = (c-1) = 2$
$SSBr = (r-1) = 2$
$SSI = (n-1) = 17$

$SST = (n-1) = 17$

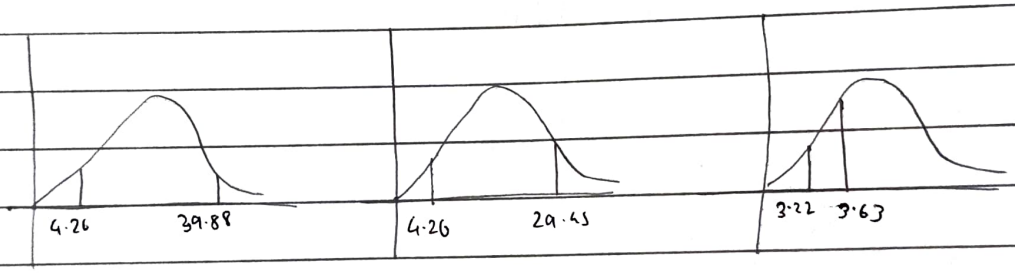
$SST = SSB_c + SSB_r = 4$

$SSW = SST - (SSB_c + SSB_r + SSI)$

$= 17 - (2 + 2 + 4)$

$= 9$

Source	S S	DOF	MS	Fs Ratio	
B/W col	469	2	234.5	39.88	$F(2,9) = 4.26$
B/W row	346.33	2	173.16	29.45	$F(2,9) = 4.26$
Interaction	75.67	4	18.92	3.22	$F(4,9) = 3.63$
within	53	9	5.88		
Total	944	17			



H_0 for 1st & 2nd part is rejected while 3rd is accepted.

Hence we conclude

1) Yes, the barbiturate types X, Y, Z are differently in reducing asylum psychosis
2) Yes groups A B C are affected differently by treatments
3) No, there is no significant info (interaction) between groups & types.

Q1

Kruskal wallis test is a non-parametric statistical test used to determine if there are statistically significant diff between 3 or more independent groups. The test works by ranking the data from all groups together and then analyzing the rank sums

This test is appropriate when:-

(1) The data does not met the assumption of normality

(2) The data is ordinal but does not met parametric test assumption.

(3) There are 3 or more independent groups being compared.

(b) Enhancer Results

14	20	24
15	20	25
16	21	25
17	21	
18	22	
18	22	

Ranks

1	7.5	13
2	7.5	14.5
3	9.5	14.5
4	9.5	
5.5	11.5	
5.5	11.5	

Name of the enhancer associated with

B	A	C
B	C	A
B	A	C
B	C	
B	A	
A	C	

Finding sum of the Ranks

A	Rank	B	Rank	C	Rank
18	5	14	1	20	7.5
20	7.5	15	2	21	9.5
21	9.5	16	3	22	11.5
22	11.5	17	4	24	13
25	14.5	18	5.5	25	14.5
5	48.5	5	15.5	5	56

Kruskal Wallis Test statistic

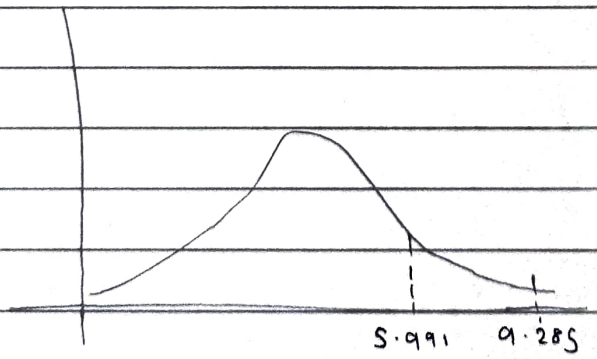
$$H = \frac{12}{n(n+1)} \sum_{i=1}^{k} \frac{R_i}{n_i} - 3(n+1)$$

$$H = \frac{12}{15(16)} \left[\frac{(48.5)^2}{5} + \frac{(15.5)^2}{5} + \frac{(56)^2}{5} \right] - 3(16)$$

$$H = 9.285$$

$$DOF = (k-1) = 3-1 = 2$$

$$LOS = 5\% \quad \therefore \quad \chi^2_{\alpha} = 0.05 = 5.991$$



(c) Null Hypothesis (H_0) : There is no statistically significant difference in the plant height between the three enhancers

Alternate hypothesis (H_1) : There is a statistically significant difference in the plant heights between the three enhancers.

(d) As the $H > \chi^2_\alpha$, H_0 is rejected and we conclude that there is a statistically significant difference in the plant heights between the three enhancers.

They have significantly different impacts on the plant species given.