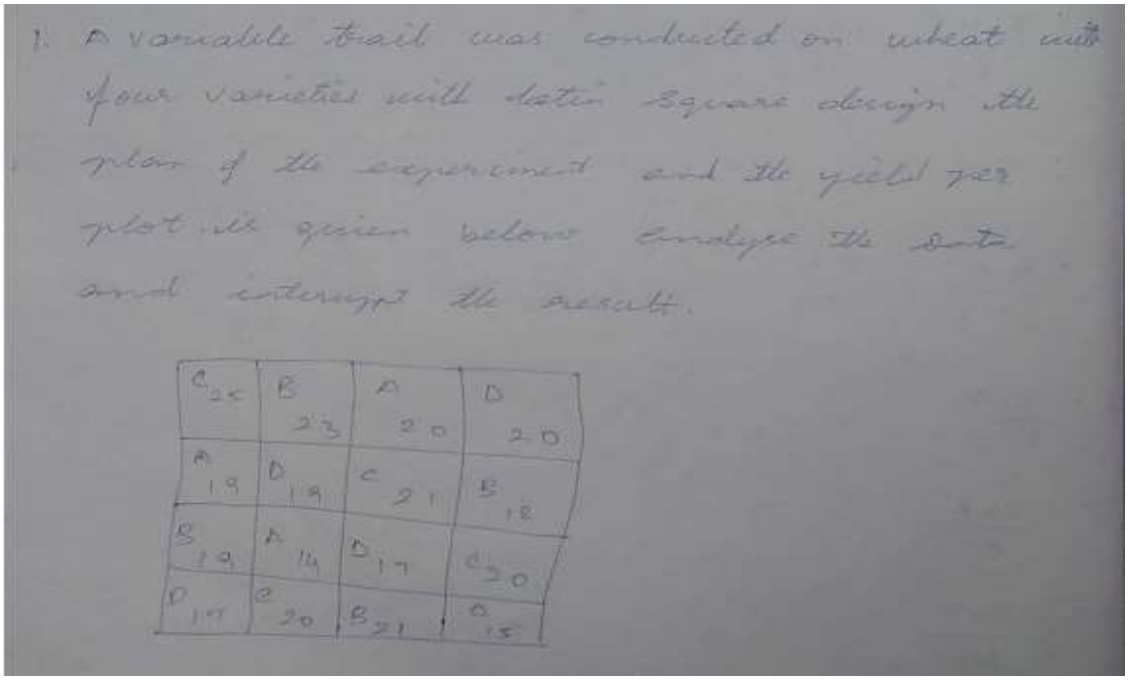
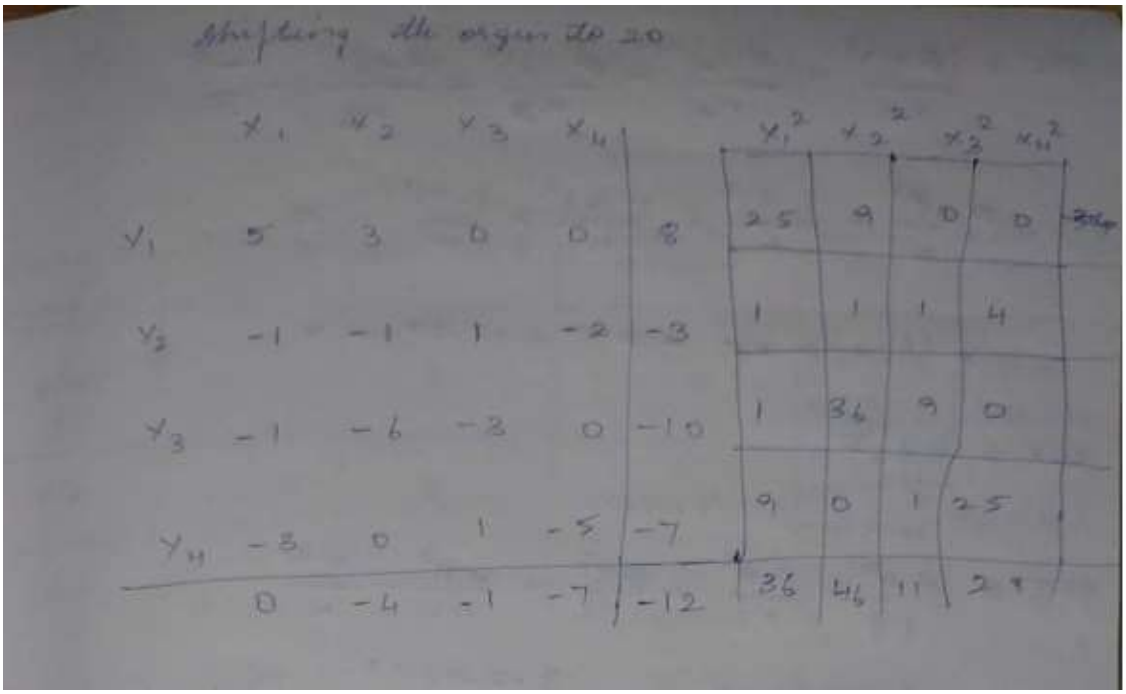
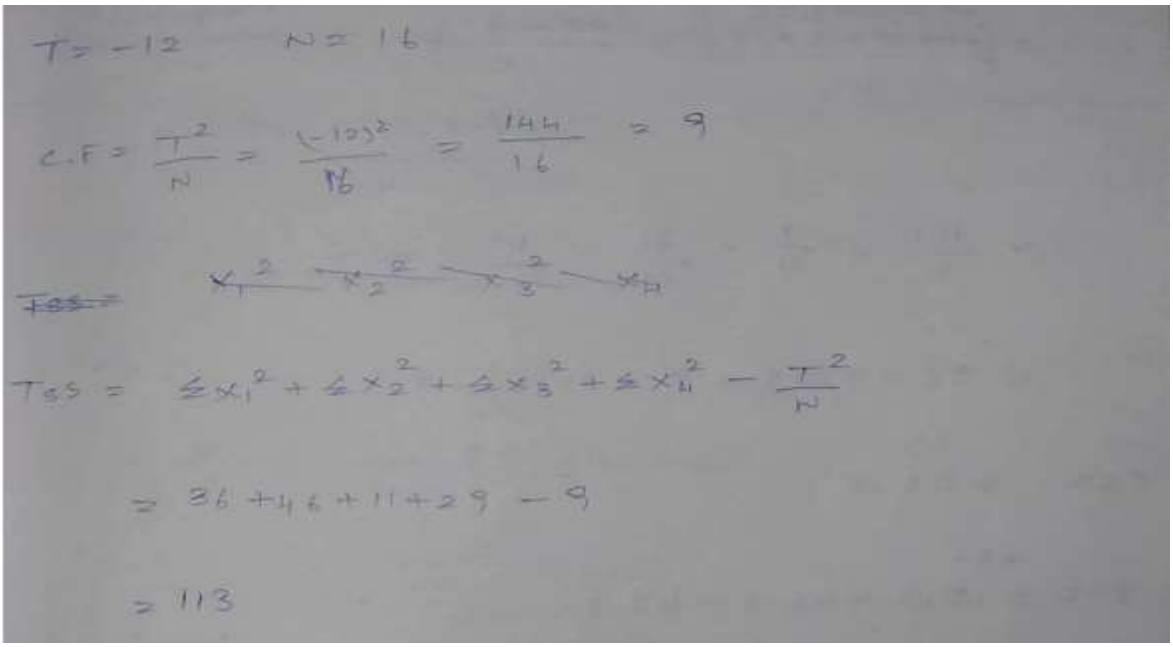
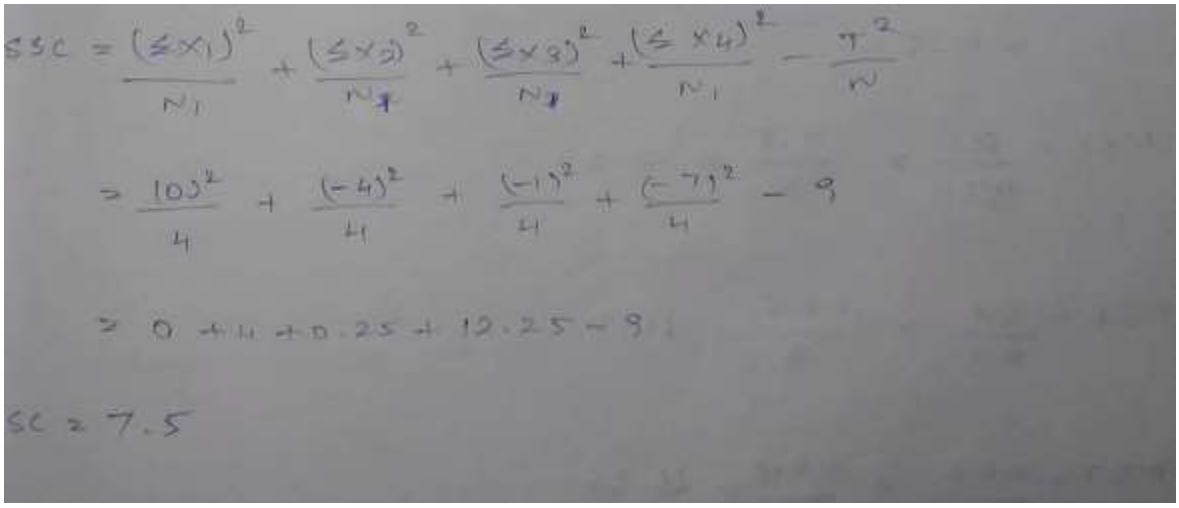
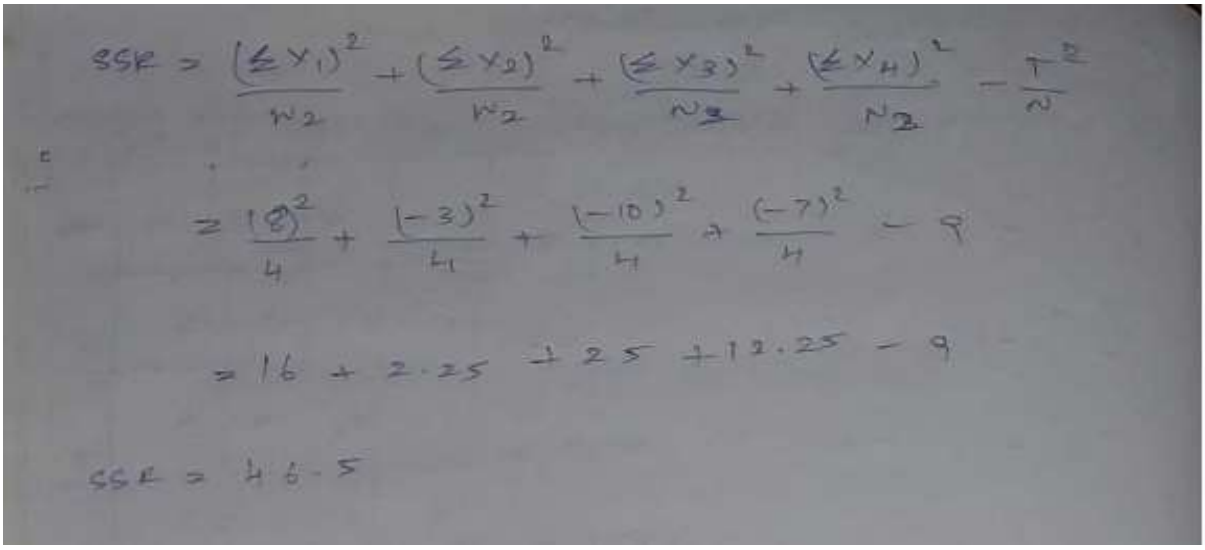
Topic: 2.10 – Latin Square Design

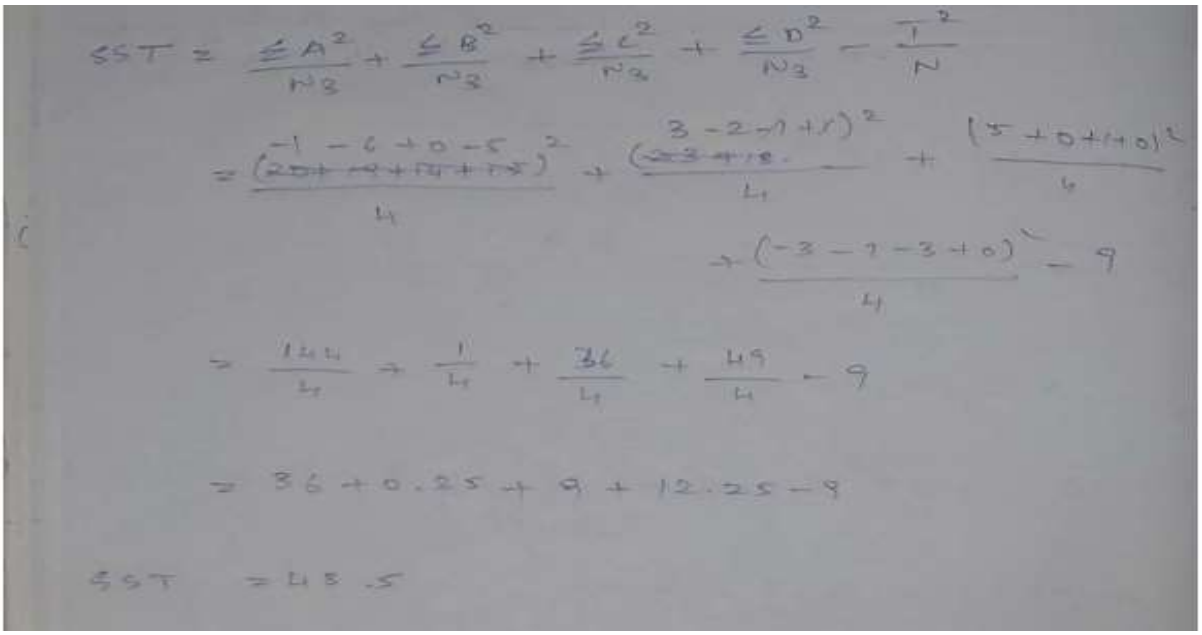


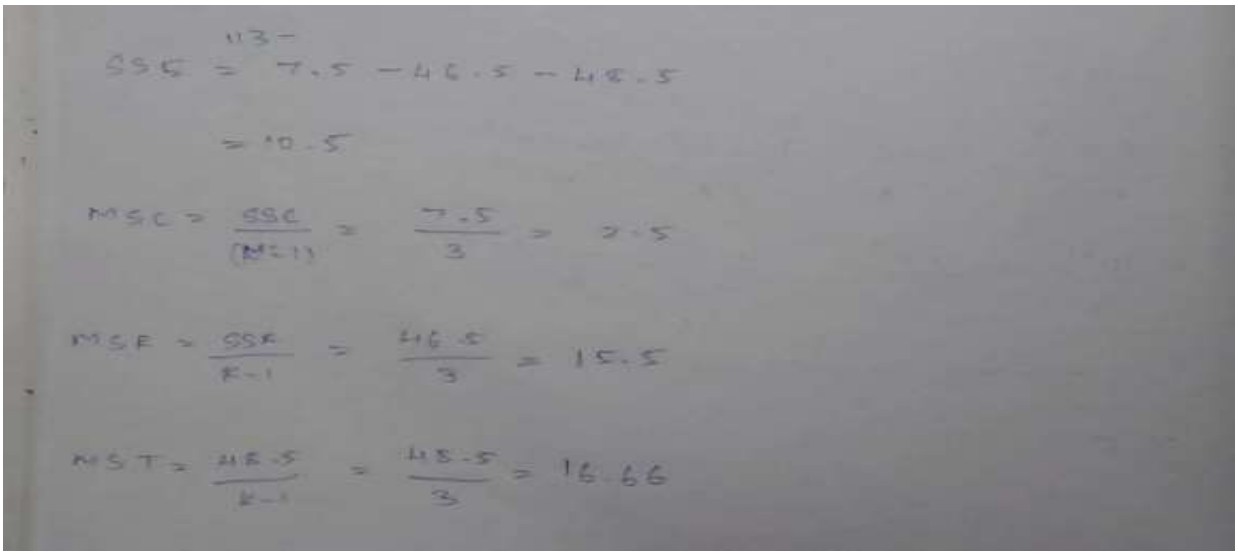


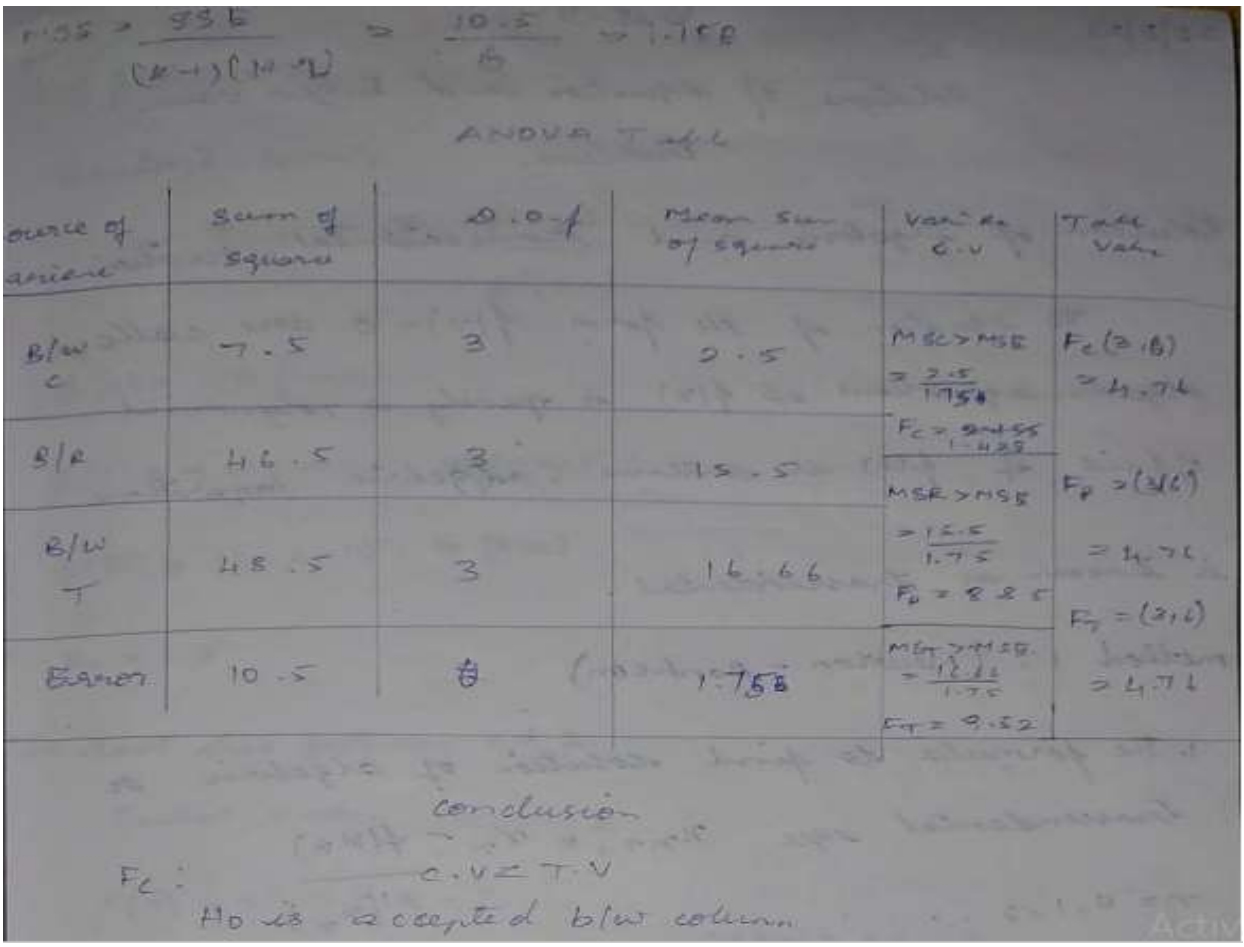

T = -12
N = 16
C.F = T²/N = (-10)²/16 = 144/16 = 9
TSS = Σx₁² + Σx₂² + Σx₃² + Σx₄² − T²/N
= 36 + 46 + 11 + 29 − 9
= 113


SSC = (Σx₁)²/N₁ + (Σx₂)²/N₂ + (Σx₃)²/N₃ + (Σx₄)²/N₄ − T²/N
= 10²/4 + (-4)²/4 + (-1)²/4 + (-7)²/4 − 9
= 0 + 4 + 0.25 + 12.25 − 9
SC = 7.5


SSR = (ΣY1)²/N2 + (ΣY2)²/N2 + (ΣY3)²/N2 + (ΣY4)²/N2 − T²/N
= (8)²/4 + (−3)²/4 + (−10)²/4 + (−7)²/4 − 9
= 16 + 2.25 + 25 + 12.25 − 9
SSR = 46.5


SST = ΣA²/N3 + ΣB²/N3 + ΣC²/N3 + ΣD²/N3 − T²/N
= (−1 − 6 + 0 − 5)²/4 + (3 − 2 − 1 + 1)²/4 + (5 + 0 + 1 + 0)²/4
+ (−3 − 1 − 3 + 0)²/4 − 9
= 144/4 + 1/4 + 36/4 + 49/4 − 9
= 36 + 0.25 + 9 + 12.25 − 9
SST = 48.5


SSE = 7.5 − 46.5 − 48.5
= 10.5
MSC = SSC / (N−1) = 7.5 / 3 = 2.5
MSR = SSR / R−1 = 46.5 / 3 = 15.5
MST = 48.5 / 3 = 16.66


MSE = SSE / (N−1)(N−2) = 10.5 / 6 = 1.75
ANOVA Table
Source of variance | Sum of square | D.O.f | Mean sum of square | Variance C.V | Table Value
B/w C | 7.5 | 3 | 2.5 | MSC > MSE = 2.5 / 1.75 | Fc(2,6) = 4.76
B/R | 46.5 | 3 | 15.5 | Fc = 2.5 / 1.75 | FR = (3,6) = 4.76
B/w T | 48.5 | 3 | 16.66 | MSR > MSE = 15.5 / 1.75, FR = 8.85 | FT = (3,6) = 4.76
Error | 10.5 | 6 | 1.75 | MST > MSE = 16.66 / 1.75, FT = 9.52 |
conclusion
Fc : C.V < T.V
Ho is accepted b/w column