ANOVA table for three factor factorial design

Source of variation	Degrees of Freedom (DF)	Sum of Squares (SS)	Mean Square (MS)	F
A	$a-1$	SS_A	$\frac{SS_A}{a-1}$	$\frac{MS_A}{MS_E}$
B	$b-1$	SS_B	$\frac{SS_B}{b-1}$	$\frac{MS_B}{MS_E}$
C	$c-1$	SS_C	$\frac{SS_C}{c-1}$	$\frac{MS_C}{MS_E}$
AB	$(a-1)(b-1)$	SS_{AB}	$\frac{SS_{AB}}{(a-1)(b-1)}$	$\frac{MS_{AB}}{MS_E}$
AC	$(a-1)(c-1)$	SS_{AC}	$\frac{SS_{AC}}{(a-1)(c-1)}$	$\frac{MS_{AC}}{MS_E}$
BC	$(b-1)(c-1)$	SS_{BC}	$\frac{SS_{BC}}{(b-1)(c-1)}$	$\frac{MS_{BC}}{MS_E}$
ABC	$(a-1)(b-1)(c-1)$	SS_{ABC}	$\frac{SS_{ABC}}{(a-1)(b-1)(c-1)}$	$\frac{MS_{ABC}}{MS_E}$
$Error$	$abc(n-1)$	SS_E	$\frac{SS_E}{abc(n-1)}$	
$Total$	$abcn-1$	SS_T		

A soft drink bottler is interested in obtaining more uniform fill heights in the bottles. The engineer can control 3 variables during the filling process: the percent carbonation (A), the operating pressure in the filler (B), and the bottles produced per minute (C, line speed). The response observed is the deviation from the target fill height.

Percent Carbonation (A)	Operating Pressure (B)			
	25 psi		30 psi	30 psi
	Line Speed (C)		Line Speed (C)	Line Speed (C)
	200	250	200	250
10	-3 -1	-1 0	-1 0	1 1
12	0 1	2 1	2 3	6 5

(i) Calculate main effect A, B, C and interact effect AB, AC, BC, ABC.

(ii) Perform ANOVA at 5% significance level.