Practical 10: Log-linear models for contingency tables

A random sample of final year high-school students was classified by socio-economic status (S), parental encouragement (E) and college plans (P) as follows:

S	E	P	
		Yes	No
Low	Yes	42	19
	No	90	47
Middle	Yes	134	72
	No	65	20
High	Yes	99	61
	No	28	11

Create a single vector for the twelve counts.
Create vectors to represent the corresponding S, E and P categories, using numeric codes (1, 2 or 1, 2, 3, as appropriate).

Use R to implement each of the Poisson regression models below. Record the Deviance, associated degrees of freedom and associated critical value for each model.

Number	Model	Deviance	d.f.	Critical Value
1	S + E + P			
2	SE + P			
3	SP + E	125.63	5	11.07
4	S + EP			
5	SE + SP			
6	SE + EP	4.03	4	9.49
7	SP + EP			
8	SE + SP + EP			

1. What is the deviance of Model S + E + P?

2. What is the deviance of Model SE + P?

3. What is the deviance of Model S + EP?

4. What is the deviance of Model SE + SP?

5. What is the deviance of Model SP + EP?

6. What is the deviance of Model SE + SP + EP?

7. Which model should be used to test the hypothesis of **complete independence of S, E and P**?

8. Test the hypothesis of **complete independence of S, E and P**.

9. Which model should be used to test the hypothesis of **block independence of E and P**?

10. Test the hypothesis of **block independence of E and P**.

11. Which model should be used to test the hypothesis of **partial independence of S and P**?

12. Test the hypothesis of **partial independence of S and P**.

13. Which model should be used to test the hypothesis of **uniform association**?

14. Test the hypothesis of **uniform association**.