Project Team Assignment.

A project-based course assigns students to project teams at the start of the term. For this purpose, each student is asked to examine the set of projects available and to identify three of the alternatives as preferred assignments. A preference of 3 indicates the most preferred project. When these preferences are collected, the instructor assigns the students to project teams, aiming for an optimal assignment of students to teams. The criterion for the assignment is to maximize the total of the preferences assigned. This year, there are 10 available projects and 16 students enrolled. There is a maximum team size between 2 and 4 on each project, according to the nature of the work to be done. It is not permissible for a student to work alone on a project (that is, in a team of size 1). The table below shows the student preferences and the limits for the team sizes.

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	Limit
P1	0	3	0	3	0	3	0	3	0	0	0	0	0	0	2	0	3
P2	0	0	3	0	0	0	3	2	0	3	0	0	0	2	0	0	3
P3	2	2	0	0	0	2	0	0	0	0	0	2	2	0	0	0	3
P4	0	0	0	1	2	0	2	0	3	0	0	0	0	0	3	0	4
P5	0	1	0	0	0	1	0	0	0	2	0	1	3	3	0	0	4
P6	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	3
P7	0	0	2	0	3	0	0	0	2	0	3	3	0	0	0	3	3
P8	3	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	2
P9	0	0	1	2	0	0	0	0	0	0	2	0	0	0	0	0	2
P10	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	1	2

a. What is the best value of the criterion—that is, the maximum sum of assigned preferences?

b. In the solution of part (a), how many students are assigned to their first choice? What is the maximum number of students who could be assigned to their first choice, if that were the only criterion?

Source of this problem: Question 12 of Chapter 11 “Integer Optimization” of book ``Business Analytics: The Art of Modeling with Spreadsheets'', by Stephen G. Powell and Kenneth R. Baker, 5 th Edition, 2017, John Wiley and Sons.