i) $\pi^+ + p : |1, +1\rangle |\frac{1}{2}, +\frac{1}{2}\rangle$ so $\frac{1}{2} \leq I_s^{tot} \leq \frac{3}{2}$ , $I_{s3}^{tot} = \frac{3}{2}$

$\therefore$ only option for $I_s^{tot} = \frac{3}{2}$

$\therefore \pi^+ + p = |\frac{3}{2} \; \frac{3}{2}\rangle$

ii) $\pi^- + n : |1, -1\rangle |\frac{1}{2}, -\frac{1}{2}\rangle$ so $\frac{1}{2} \leq I_s^{tot} \leq \frac{3}{2}$ , $I_{s3}^{tot} = -\frac{3}{2}$

$\therefore$ only option for $I_s^{tot} = \frac{3}{2}$

$\therefore \pi^- + n = |\frac{3}{2}, -\frac{3}{2}\rangle$

iii) $\pi^0 + p : |1, 0\rangle |\frac{1}{2}, +\frac{1}{2}\rangle$ so $\frac{1}{2} \leq I_s^{tot} \leq \frac{3}{2}$ , $I_{s3}^{tot} = +\frac{1}{2}$

so $I_s^{tot}$ can be $\frac{1}{2}$ or $\frac{3}{2}$

so we need to consult Clebsch-Gordan table or used the expression given

$\therefore \pi^0 + p = \sqrt{\frac{2}{3}} |\frac{3}{2}, \frac{1}{2}\rangle - \sqrt{\frac{1}{3}} |\frac{1}{2}, \frac{1}{2}\rangle$

Similarly as (iii) consulting expressions given

iv) $\pi^- + p : |1, -1\rangle |\frac{1}{2}, \frac{1}{2}\rangle = \sqrt{\frac{1}{3}} |\frac{3}{2}, -\frac{1}{2}\rangle - \sqrt{\frac{2}{3}} |\frac{1}{2}, -\frac{1}{2}\rangle$

v) $\pi^+ + n : |1, +1\rangle |\frac{1}{2}, -\frac{1}{2}\rangle = \sqrt{\frac{1}{3}} |\frac{3}{2}, +\frac{1}{2}\rangle + \sqrt{\frac{2}{3}} |\frac{1}{2}, +\frac{1}{2}\rangle$

vi) $\pi^0 + n : |1, 0\rangle |\frac{1}{2}, -\frac{1}{2}\rangle = \sqrt{\frac{2}{3}} |\frac{3}{2}, -\frac{1}{2}\rangle + \sqrt{\frac{1}{3}} |\frac{1}{2}, -\frac{1}{2}\rangle$