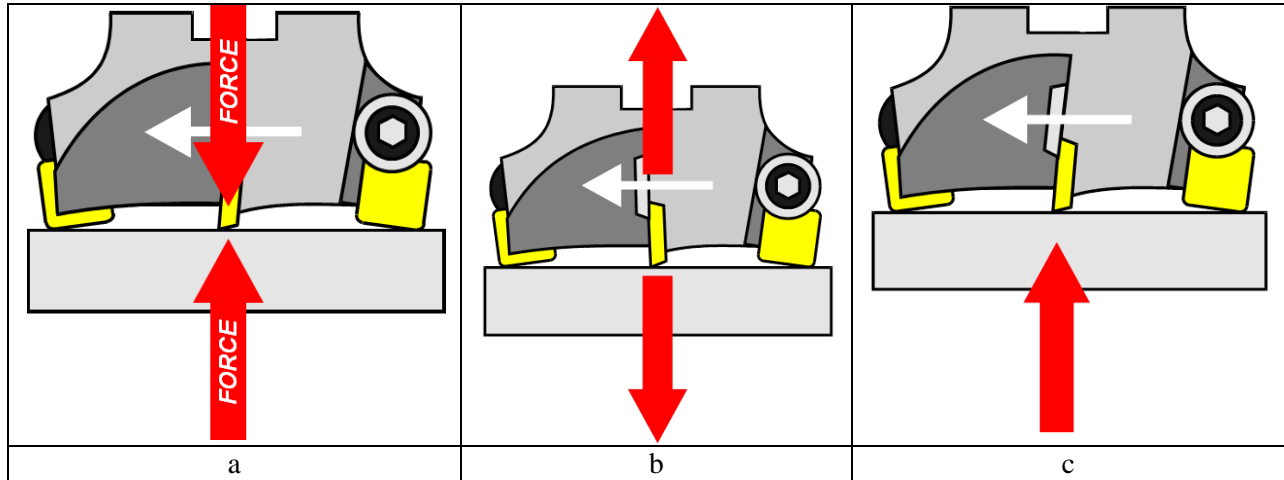


1 – What is the difference between Vertical/Horizontal center machine and milling machine?
(5 points)

سوال ۲ - در شکل‌های زیر زوایای شعاعی و محوری ابزار را با توجه به نیروهای اعمالی به میز و اسپیندل ماشین تعیین نمایید؟ کدام حالت را برای ماشینکاری چدن پیشنهاد میکنید؟ (۵ نمره)



3 – Prove that the cutting force on a four-fluted cutter in slotting is constant.

Help: the below figure represents a section through a four-fluted cutter in slotting operation: you can consider a slice with axial thickness Δa . At whichever axial level this slice is taken there will be two edges in the cut between $\varphi_s = 0$ and $\varphi_{e_s} = 180$: one at angle φ_1 and the other one at angle $\varphi_2 = \varphi_1 + 90$. Then, try to calculate the forces. (10 points)