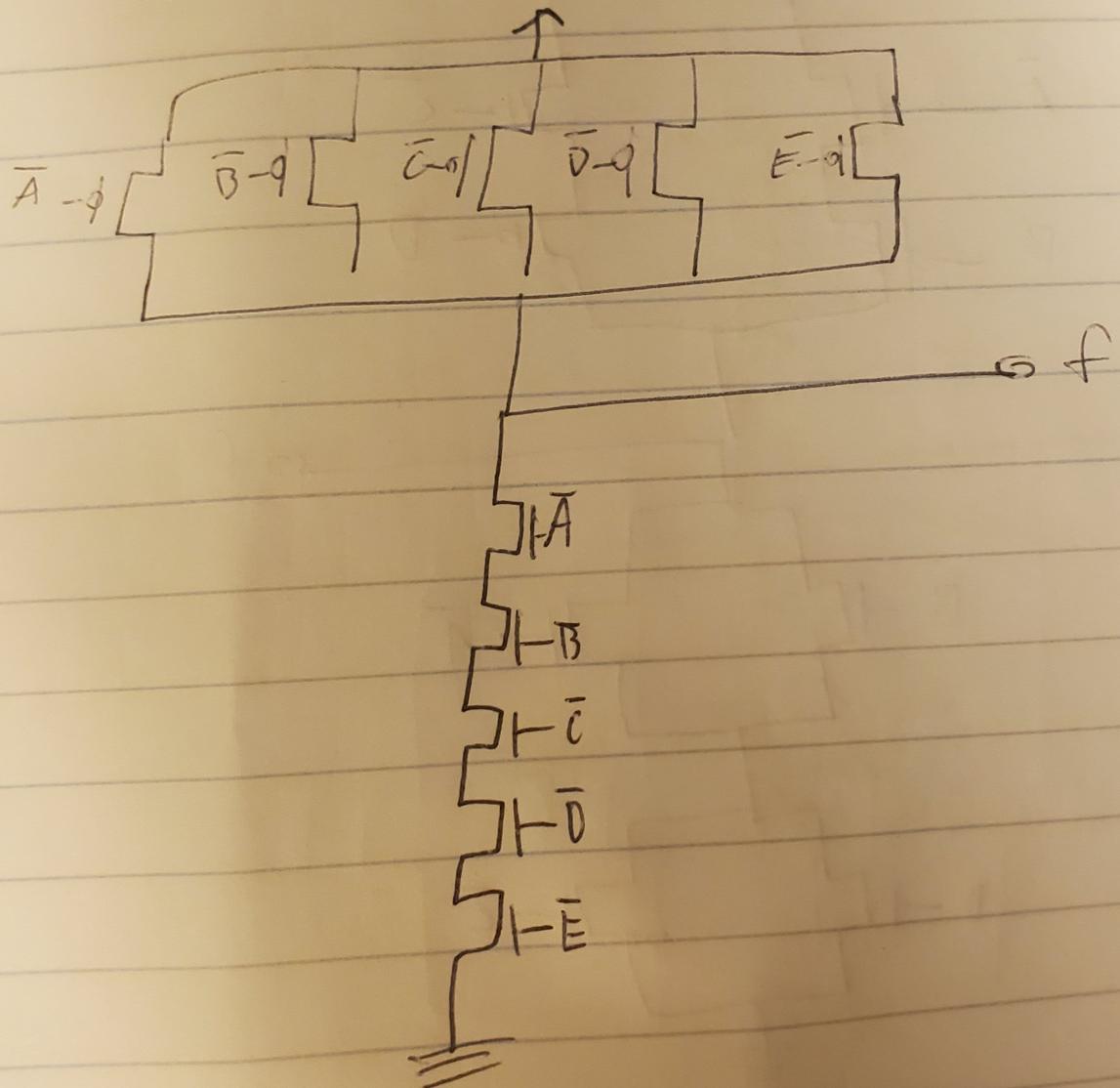
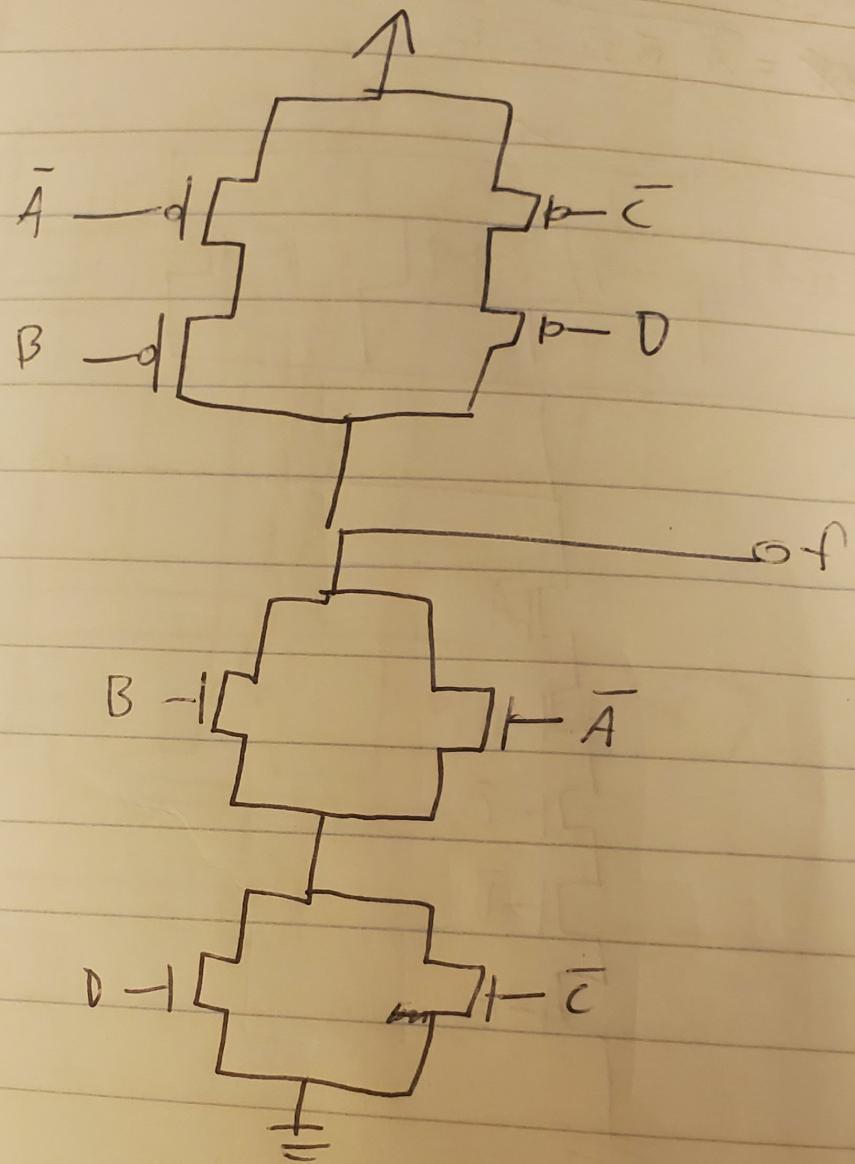


$$A. \quad f = A(B+D)(C+E) = \overline{A}(\overline{B+D})(\overline{C+E}) = \overline{\overline{A}}(\overline{\overline{B+D}})(\overline{\overline{C+E}})$$

~~\overline{A}~~ = $\overline{\overline{A}}$ $\overline{B} \overline{D} \overline{C} \overline{E}$

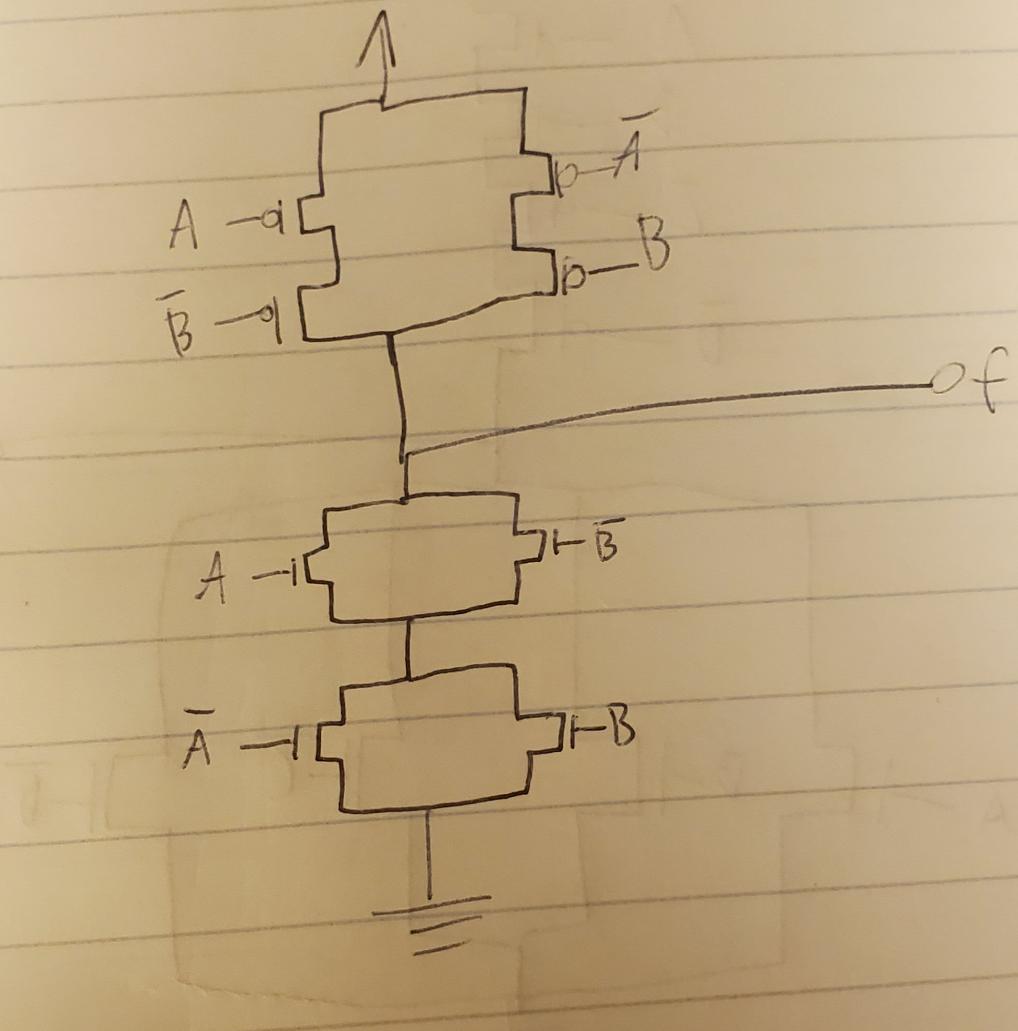


$$B \cdot f = (\overline{A} + B)(\overline{C} + D)$$

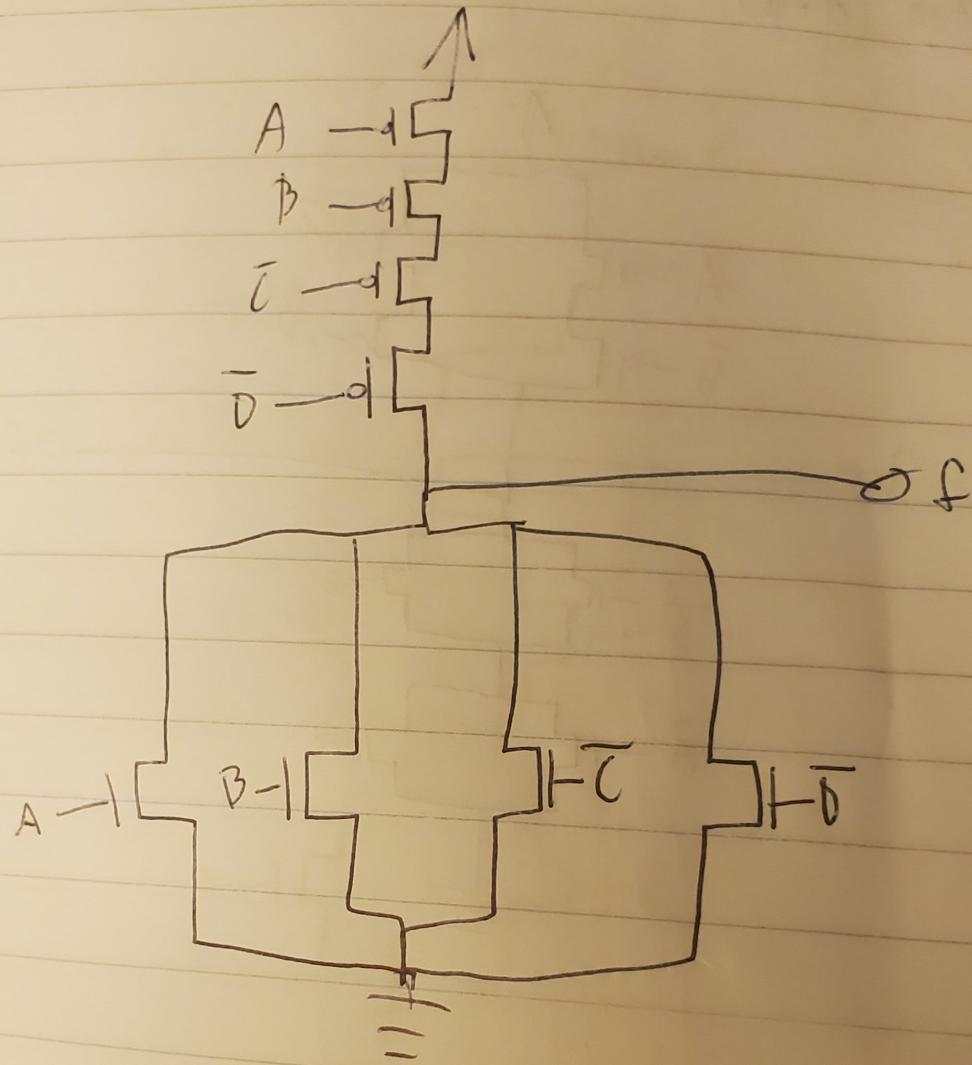


$$f = \overline{AB} + A\overline{B} = \overline{\overline{AB} + A\overline{B}} = \overline{\overline{AB} + \overline{A}\overline{B}} = \overline{\overline{A}\overline{B} + \overline{A}\overline{B}} = \cancel{\overline{A}\overline{B}} + \cancel{\overline{A}\overline{B}}$$

$$= (\overline{A} + \overline{B}) (\overline{A} + \overline{B})$$



$$D \quad f = \overline{A + (\overline{B} + CD)} = \overline{A + B + \overline{CD}} = \overline{A + B + \overline{C} + \overline{D}}$$



$$E \quad f = \bar{A} + \bar{B}C = \overline{\bar{A} + \bar{B}C} = \overline{\bar{A}\bar{B}C} = \overline{A(B + \bar{C})}$$

