GATE CS 2023
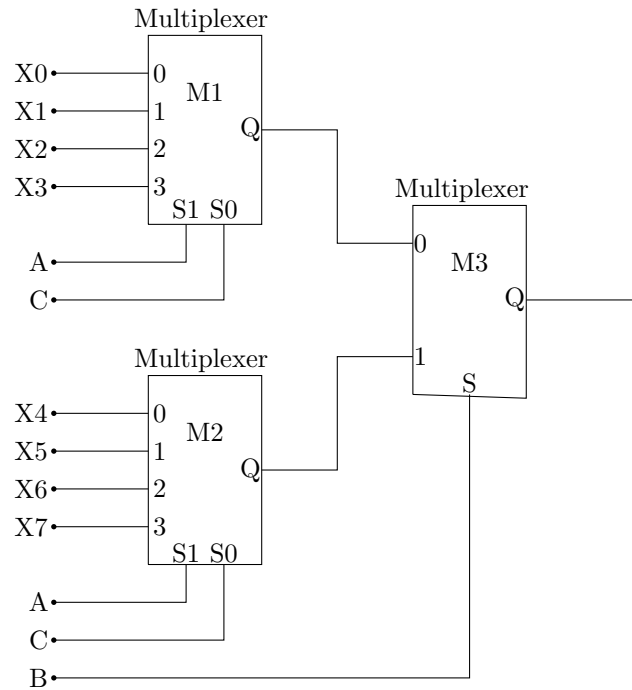
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1. A Boolean digital circuit is composed using two 4-input multiplexers ($M1 and M2$) and one 2-input multiplexer ($M3$) as shown in the figure. $X0$–$X7$ are the inputs of the multiplexers $M1$ and $M2$ and could be connected to either 0 or 1. The select lines of the multiplexers are connected to Boolean variables A, B and C as shown. (GATE CS2023,44)

Which one of the following set of values of $(X0, X1, X2, X3, X4, X5, X6, X7)$ will realise the Boolean function $\overline{A} + \overline{A}.\overline{C} + A.\overline{B}.C$?

(a) (1, 1, 0, 0, 1, 1, 1, 0)

(b) (1, 1, 0, 0, 1, 1, 0, 1)

(c) (1, 1, 0, 1, 1, 1, 0, 0)

(d) (0, 0, 1, 1, 0, 1, 1, 1)