Q) Consider the quadratic equation $(c - 5)x^2 - 2cx + (c - 4) = 0$, $c \neq 5$. Let S be the set of all integral values of c for which one root of the equation lies in the interval (0, 2) and its other root lies in the interval (2, 3). Then the number of elements in S is –

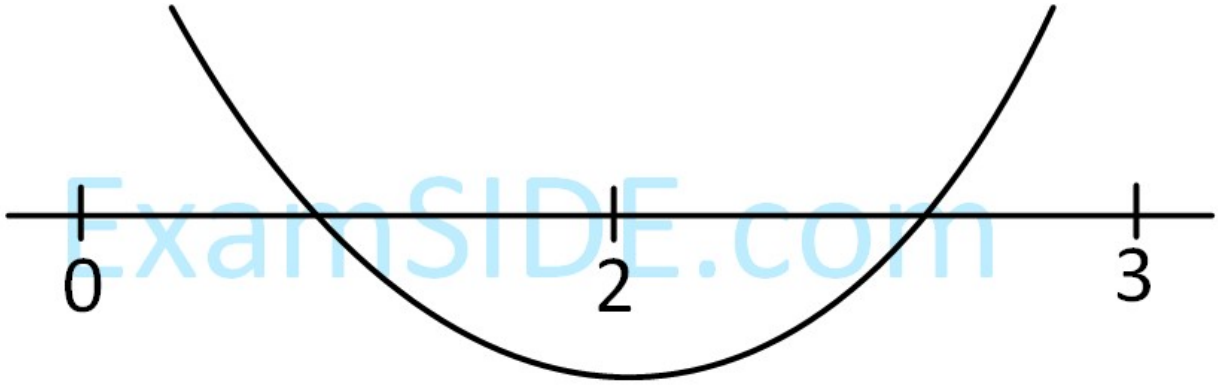
A) 12

B) 18

C) 10

D) 11

Solution:



Let $f(x) = (c - 5)x^2 - 2cx + c - 4$

$\therefore$ $f(0)f(2) < 0$ . . . . .(1)

& $f(2)f(3) < 0$ . . . . .(2)

from (1) and (2)

$(c - 4)(c - 24) < 0$

& $(c - 24)(4c - 49) < 0$

$\Rightarrow$ $494 < c < 24$

$\therefore$ s = {113, 14, 15, ... 23}

Number of elements in set S = 11