Q. If $x^2 + y^2 - 8x - 6y + c = 0$ is the equation of a circle which touches another circle $x^2 + y^2 = 1$, Then the possible value(s) of c is(are)

[A] -11

[B] 25

[C] 9

[D] 16

Answer: [A][C]

Solution:

C_1: centre (4,3) & radius $\sqrt{25-c}$

C_2: centre (0,0) & radius 1

Touching may happen externally or internally

Case-I (externally)

$$C_1C_2 = r_1 + r_2$$

$$5 = 1 + \sqrt{25-c}$$

$$c = 9$$

Case-II (internally)

$$C_1C_2 = |r_1 - r_2|$$

$$5 = \pm(1 - \sqrt{25 - c}\,)$$

$$c = -11$$