

Q2. Find the equation of the circle whose radius is 5 and which touches the circle $x^2 + y^2 - 2x - 4y - 20 = 0$ at the point (5, 5). **[1978]**

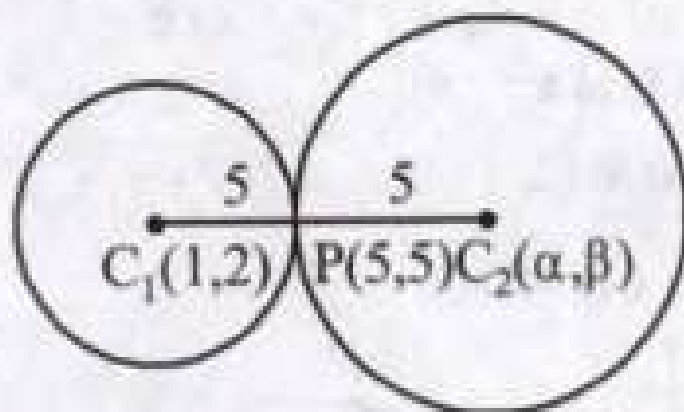
Sol 2. Given : A circle

$$x^2 + y^2 - 2x - 4y - 20 = 0$$

with centre $(1, 2)$ and radius = 5

Radius of required circle is also 5.

Let its centre be $C_2 (\alpha, \beta)$. Both the circles touch each other at $P (5, 5)$.



Clearly $P (5, 5)$ is the mid-point of $C_1 C_2$.

$$\therefore \frac{1+\alpha}{2} = 5 \text{ and } \frac{2+\beta}{2} = 5 \Rightarrow \alpha = 9 \text{ and } \beta = 8$$

\therefore Centre of required circle is $(9, 8)$ and equation of required circle is $(x-9)^2 + (y-8)^2 = 5^2$

$$\Rightarrow x^2 + y^2 - 18x - 16y + 120 = 0$$