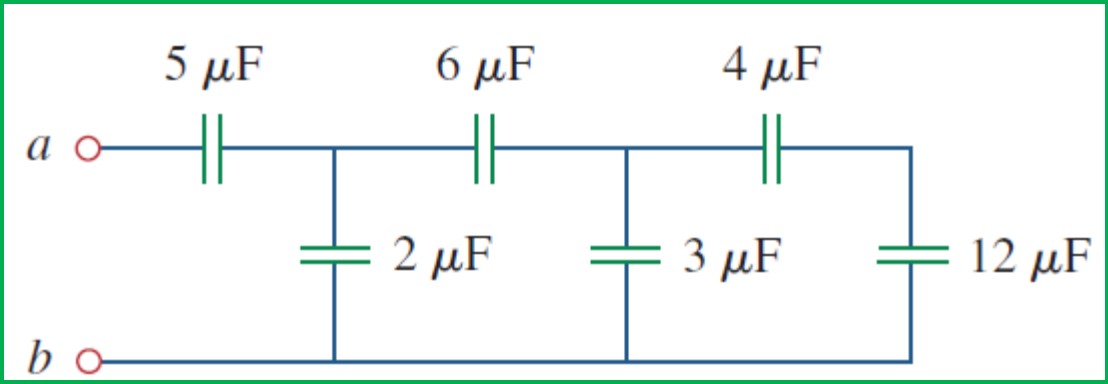
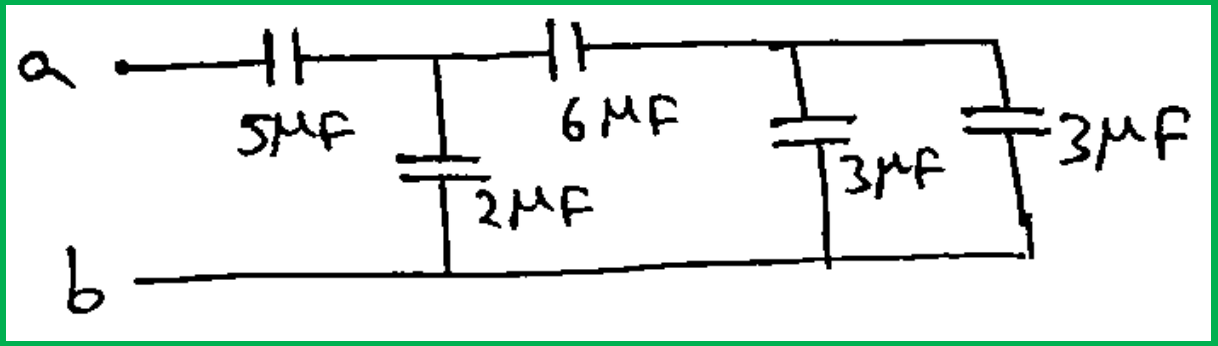
# Series and parallel connection - Capacitor

# Find $C_{eq}$ in the circuit




4 μF in series with 12 μF

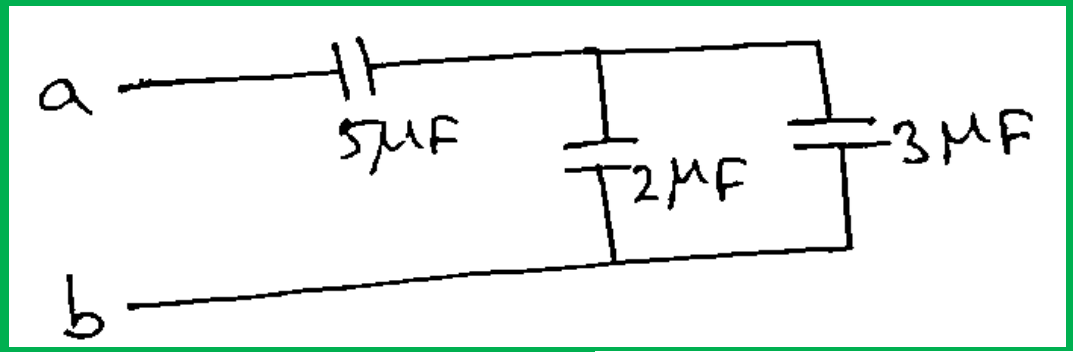
$\therefore C_1 = 3\,\mu F$




$3\mu F \,||\, 3\mu F$ in series to $6\mu F$

$$\therefore C_2 = 3 + 3||6$$

$$= \frac{6 \times 6}{6+6} = \frac{36}{12} = 3\mu F$$

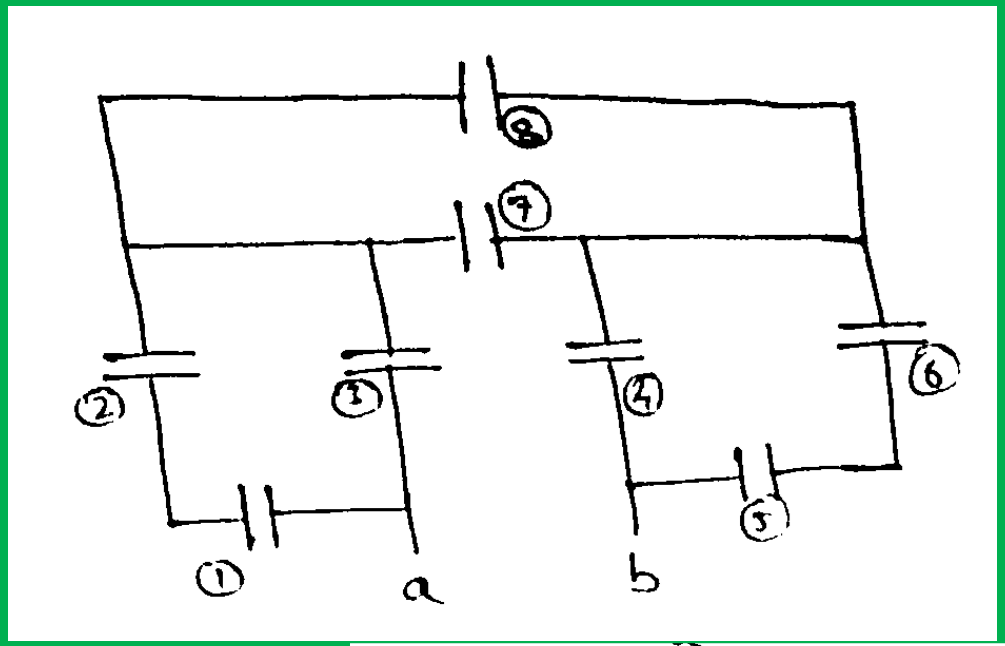



$2\mu F \,||\, 3\mu F$ in series with $5\,\mu F$

$\therefore C_{eq} = 2+3 \,||\, 5$

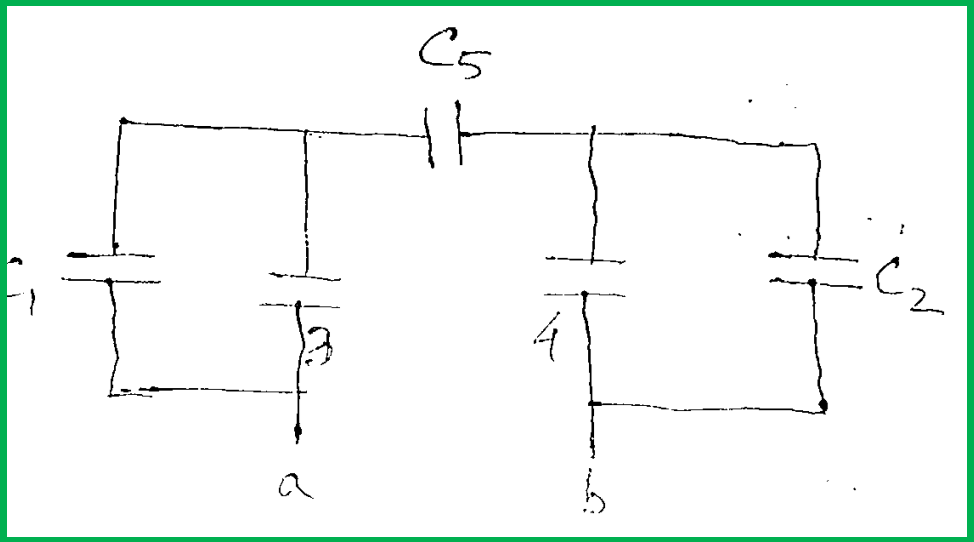
$= \frac{5\times 5}{5+5} = 2.5\mu F.$

Find $C_{eq}$ in the circuit, if all capacitors are 4μF




① ② and ⑦ are parallel

$\therefore C_5 = 8\mu F.$




$C_1$ and (3) / and / $C_2$ and (4) are parallel.

$\therefore C_3 = C_1 \| 4$

$C_3 = 2+4$

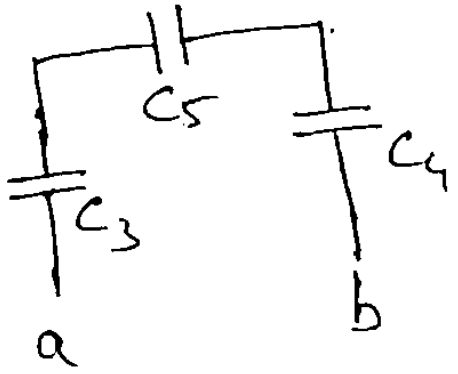
$= 6\mu F$

$C_4 = C_2 \| 4$

$C_4 = 2+4$

$= 6\mu F$

Now




$$C_{eq} = \left[\frac{1}{C_3} + \frac{1}{C_4} + \frac{1}{C_5}\right]^{-1}$$

$$= \left[\frac{11}{24}\right]^{-1}$$

$$= 2.18\,\mu F.$$

# Reference


1. Edward Hughes. “Electrical and Electronic Technology”, 10th Edition, Pearson Education Asia, 2019
2. Alexander and Sadiku. “Fundamental of electric circuits”, McGraw-Hill, Fifth editon

# Thank You