a) Design an inverting amplifier with gain 10 and input resistance equal to 10kΩ.

For an inverting amplifier,

$$\text{gain} = -\frac{R_f}{R_1}$$

$$\therefore R_f = \text{gain} \times R_1$$

$$= 10 \times 10\,k\Omega$$

$$= 100\,k\Omega.$$

a) Design a non inverting amplifier with gain 9.

For non inverting amp,

$$\text{gain} = 1 + \frac{R_f}{R_1}$$

$$i.e \quad 1 + \frac{R_f}{R_1} = 9$$

$$\frac{R_f}{R_1} = 9 - 1 = 8.$$

Let $R_1 = 10\,k\Omega$.

$$\therefore R_f = 10k \times 8 = 80k\Omega$$