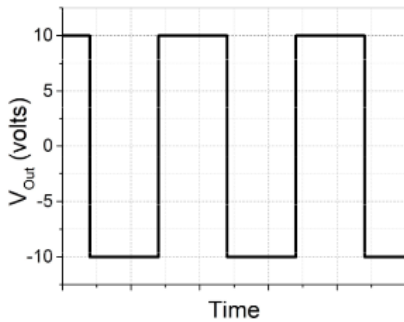
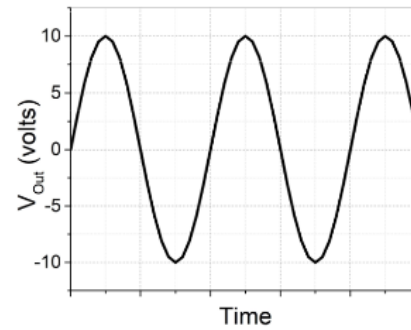
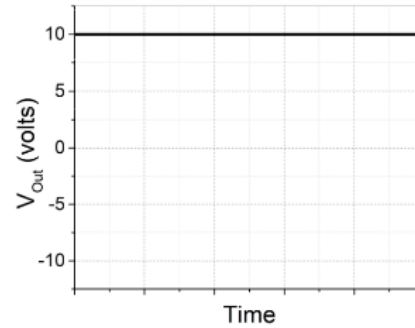
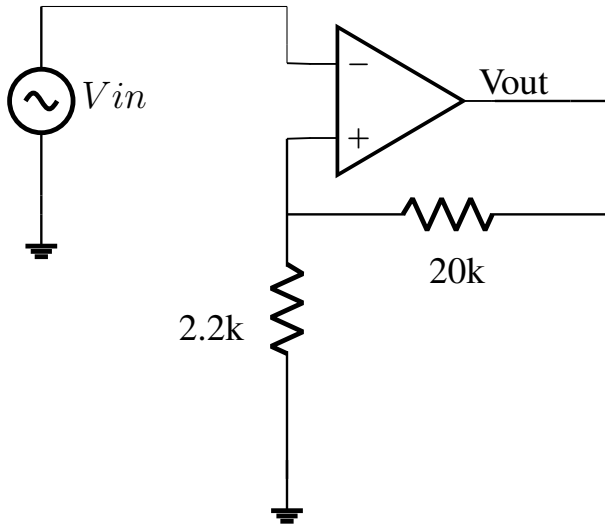


# GATE 2022-PH

EE23BTECH1205 - Avani Chouhan\*

## Question : 11

For the Op-Amp circuit shown below, choose the correct output waveform corresponding to the input  $V_{in} = 1.5 \sin(20\pi t)$  (in Volts). The saturation voltage for this circuit is  $V_{sat} = \pm 10$  V.



- (A)  
(B)  
(C)  
(D)

(GATE PH 2022)

**Solution:**

$$V_{in} = 1.5 \sin(20\pi t) \quad (1)$$

$$V_{sat} = \pm 10 \text{ V} \quad (2)$$

$$I_1 = I_2 \quad (3)$$

$$\frac{0 - V_{in}}{2.2 \text{ k}\Omega} = \frac{V_{in} - V_o}{20 \text{ k}\Omega} \quad (4)$$

$$\frac{-20}{2.2} = \frac{V_{in} - V_o}{V_{in}} \quad (5)$$

$$\frac{-20}{2.2} = 1 - \frac{V_o}{V_{in}} \quad (6)$$

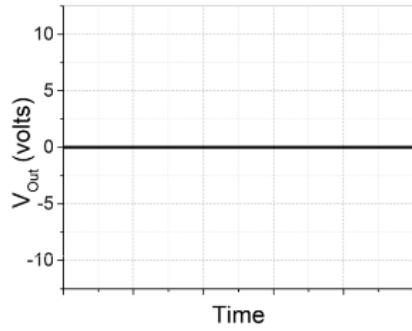
$$\frac{V_o}{V_{in}} = 1 + \frac{20}{2.2} \quad (7)$$

$$V_o \sim 10V_{in} \quad (8)$$

$$V_o = 10 \times 1.5 \sin(20\pi t) \quad (9)$$

Parameter	Value
$V_{in}$	$1.5 \sin(20\pi t)$
$V_{sat}$	$\pm 10 \text{ V}$
$V_{out}$	$10 \times 1.5 \sin(20\pi t)$

TABLE 0



Output amplitude is greater than  $V_{\text{sat}}$ , so the voltage saturates at  $V_{\text{sat}}$ . So, the correct answer is (A).