Name:	**Dr JBO**
Student ID Number:	**Model Answer**
Section:	
Lecturer:	Dr. Jamaludin Bin Omar

EEEB273 ï Quiz 7
SEMESTER 2, ACADEMIC YEAR 2014/2015
Date: 29 January 2015 Time: 15 minutes

Question:

For the op-amp circuit in **Figure 1, R_1 = 50 kΩ, R_2 = 200 kΩ, R_3 = 25 kΩ,** and **R_4 = 50 kΩ.**

(a) **Find** the voltage gain, A_v, of the circuit. $A_v = v_O / v_I$ **[6 marks]**

(b) **Calculate v_O** when **v_I = 0.5 V**. **[4 marks]**

Show clearly all calculations in order to get full marks.

Answer:

(a)

$v_1 = v_2 = (R_4/(R_3+R_4))(v_I)$ [2]
$= (50k/75k)(v_I) = (2/3)(v_I)$ [1]

$v_O = (1 + R_2/R_1)(v_1)$ [1]
$= (1 + 200k/50k)(2/3)(v_I)$
$= (10/3)(v_I)$ [1]

$A_v = v_O / v_I = 10/3 = 3.333$ V/V [1]

(b)

$v_O = A_v v_I = (10/3)(v_I)$ [2]
$= (10/3)(0.5) = 1.667$ V [2]

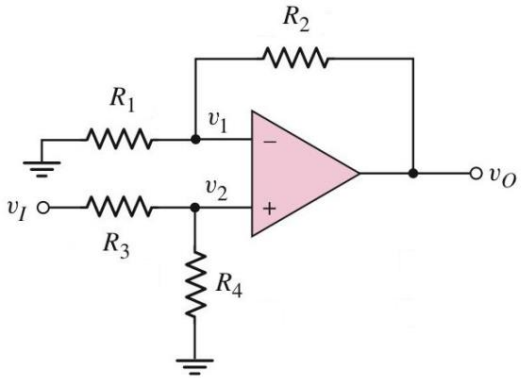

Figure 1

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Question:

For the op-amp circuit in **Figure 1, R_1 = 50 kΩ, R_2 = 250 kΩ, R_3 = 25 kΩ**, and **R_4 = 25 kΩ.**

(a) **Find** the voltage gain, A_v, of the circuit. $A_v = v_O / v_I$ **[6 marks]**

(b) **Calculate v_O** when **v_I = 0.6 V**. **[4 marks]**

Show clearly all calculations in order to get full marks.

Answer:

(a)

$v_1 = v_2 = (R_4/(R_3+R_4))(v_I)$ [2]
$= (25k/50k)(v_I) = (1/2)(v_I)$ [1]

$v_O = (1 + R_2/R_1)(v_1)$ [1]
$= (1 + 250k/50k)(1/2)(v_I)$
$= (3)(v_I)$ [1]

$A_v = v_O / v_I = 3$ V/V [1]

(b)

$v_O = A_v v_I = (3)(v_I)$ [2]
$= (3)(0.6) = 1.8$ V [2]

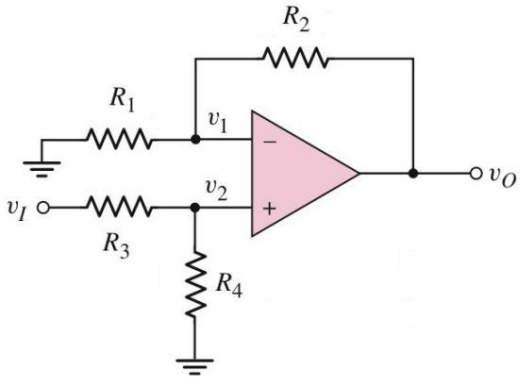

Figure 1

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Question:

For the op-amp circuit in **Figure 1, R_1 = 50 kΩ, R_2 = 150 kΩ, R_3 = 50 kΩ,** and **R_4 = 25 kΩ.**

(a) **Find** the voltage gain, A_v, of the circuit. $A_v = v_O / v_I$ **[6 marks]**

(b) **Calculate v_O** when **v_I = 0.7 V**. **[4 marks]**

Show clearly all calculations in order to get full marks.

Answer:

(a)

$v_1 = v_2 = (R_4/(R_3+R_4))(v_I)$ [2]
$= (25k/75k)(v_I) = (1/3)(v_I)$ [1]

$v_O = (1 + R_2/R_1)(v_1)$ [1]
$= (1 + 150k/50k)(1/3)(v_I)$
$= (4/3)(v_I)$ [1]

$A_v = v_O / v_I = 4/3 = 1.333$ V/V [1]

(b)

$v_O = A_v v_I = (4/3)(v_I)$ [2]
$= (4/3)(0.7) = 0.933$ V [2]

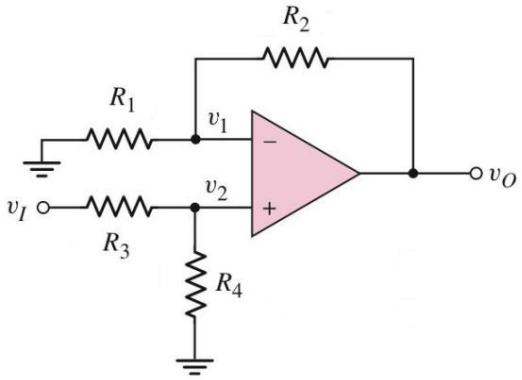

Figure 1

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Question:

For the op-amp circuit in **Figure 1, R_1 = 25 kΩ, R_2 = 150 kΩ, R_3 = 25 kΩ**, and **R_4 = 50 kΩ.**

(a) **Find** the voltage gain, A_v, of the circuit. $A_v = v_O / v_I$ **[6 marks]**

(b) **Calculate v_O** when **v_I = 0.8 V**. **[4 marks]**

Show clearly all calculations in order to get full marks.

Answer:

(a)

$v_1 = v_2 = (R_4/(R_3+R_4))(v_I)$ [2]
$= (50k/75k)(v_I) = (2/3)(v_I)$ [1]

$v_O = (1 + R_2/R_1)(v_1)$ [1]
$= (1 + 150k/25k)(2/3)(v_I)$
$= (14/3)(v_I)$ [1]

$A_v = v_O / v_I = 4.667$ V/V [1]

(b)

$v_O = A_v v_I = (4.667)(v_I)$ [2]
$= (4.667)(0.8) = 3.7336$ V [2]

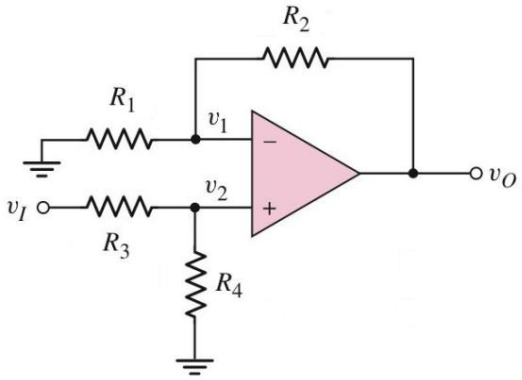

Figure 1