Name:	**Dr JBO**
Student ID Number:	**Model Answer**
Section: 01/02 A/B	
Lecturer: Dr. Jamaludin Bin Omar	

EEEB273 - Quiz 7
SEMESTER 2, ACADEMIC YEAR 2015/2016
Date: 21 January 2016 Time: 15 minutes

Question:

Refer to **ideal** inverting op-amp in **Figure 1**. **Calculate** its closed-loop voltage gain ($A_d = v_O / v_I$) **range** if R_1 = **20 kΩ** and R_2 is a potentiometer (**having variable resistance**) with value from **20 kΩ** to **50 kΩ.**

Show your calculation clearly.

[10 marks]

Potentiometer

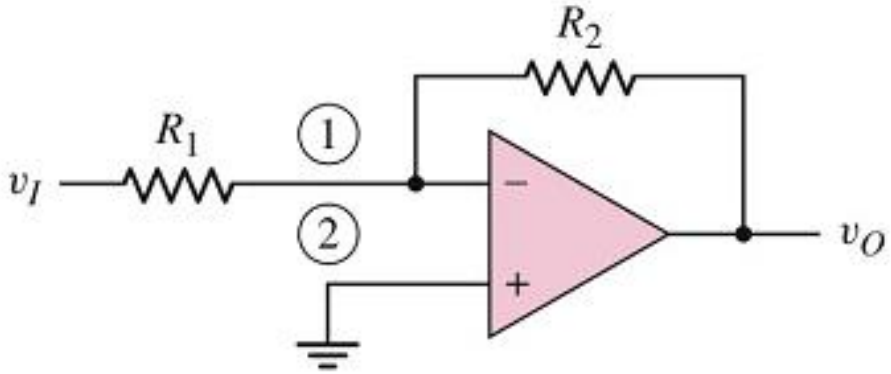

Figure 1

Answer:

$A_d = v_O / v_I = - R_2 / R_1$ [1]

R_2 **is a potentiometer, so** R_2 **(min) = 20 kΩ and** R_2 **(max) = 50 kΩ** [1, 1]

$R_1 = 20$ **kΩ** [1]

A_d**(min) = -** R_2 **(min) /** R_1 **= -20k/20k = -1 V/V** [2, 1]

A_d**(max) = -** R_2 **(max) /** R_1 **= -50k/20k = -2.5 V/V** [2, 1]

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Question:

Refer to **ideal** inverting op-amp in **Figure 1**. **Calculate** its closed-loop voltage gain ($A_d = v_O / v_I$) **range** if R_1 = **15 kΩ** and R_2 is a potentiometer (**having variable resistance**) with value from **10 kΩ** to **40 kΩ.**

Show your calculation clearly.

[10 marks]

Potentiometer

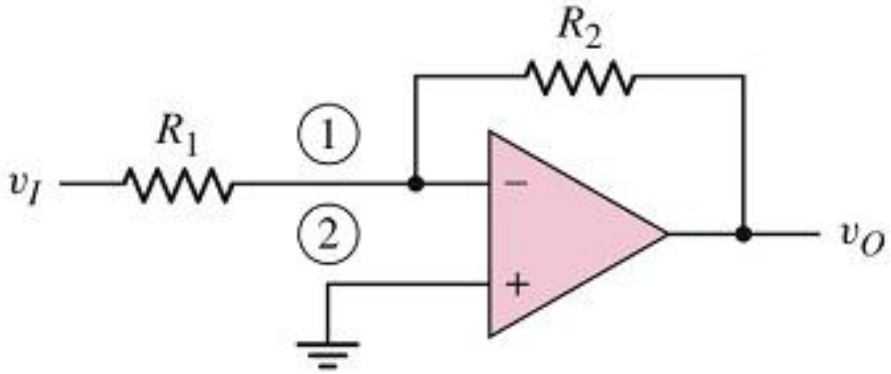

Figure 1

Answer:

$A_d = v_O / v_I = - R_2 / R_1$ **[1]**

R_2 **is a potentiometer, so** R_2**(min) = 10 kΩ and** R_2**(max) = 40 kΩ** **[1, 1]**

$R_1 = 15$ **kΩ** **[1]**

A_d**(min) = -** R_2**(min) /** R_1 **= -10k/15k = -0.667 V/V** **[2, 1]**

A_d**(max) = -** R_2**(max) /** R_1 **= -40k/15k = -2.667 V/V** **[2, 1]**

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Show your calculation clearly.

[10 marks]

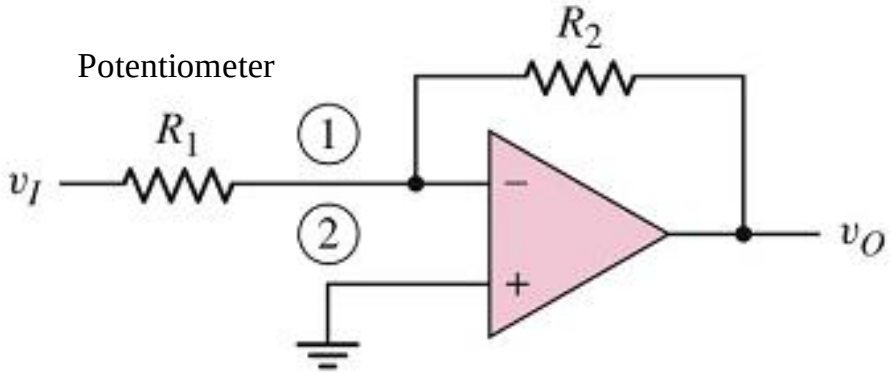

Figure 1

Answer:

$A_d = v_O / v_I = - R_2 / R_1$ **[1]**

R_1 **is a potentiometer, so** R_1**(min) = 20 kΩ and** R_1**(max) = 50 kΩ** **[1, 1]**

R_2 **= 20 kΩ** **[1]**

A_d**(min) =** $- R_2 / R_1$**(max) = -20k/50k = -0.4 V/V** **[2, 1]**

A_d**(max) =** $- R_2 / R_1$**(min) = -20k/20k = -1 V/V** **[2, 1]**

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Show your calculation clearly.

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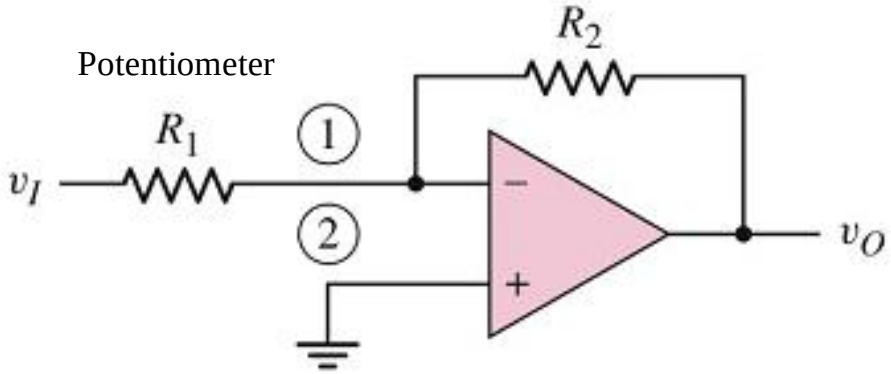

Figure 1

Answer:

$A_d = v_O / v_I = - R_2 / R_1$ **[1]**

R_1 **is a potentiometer, so** R_1**(min) = 10 kΩ and** R_1**(max) = 40 kΩ** **[1, 1]**

$R_2 = 15$ **kΩ** **[1]**

A_d**(min) =** $- R_2 / R_1$**(max) = -15k/40k = -0.375 V/V** **[2, 1]**

A_d**(max) =** $- R_2 / R_1$**(min) = -15k/10k = -1.5 V/V** **[2, 1]**