

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

- (a) (i) Without drawing circuit diagrams, explain the difference between *positive feedback* and *negative feedback*, in the case of an operational amplifier.

For each feedback, state how the gain of the amplifier is affected when compared with the open loop gain.

- (ii) Give **two** advantages of using negative feedback in the case of an audio amplifier.

(5)

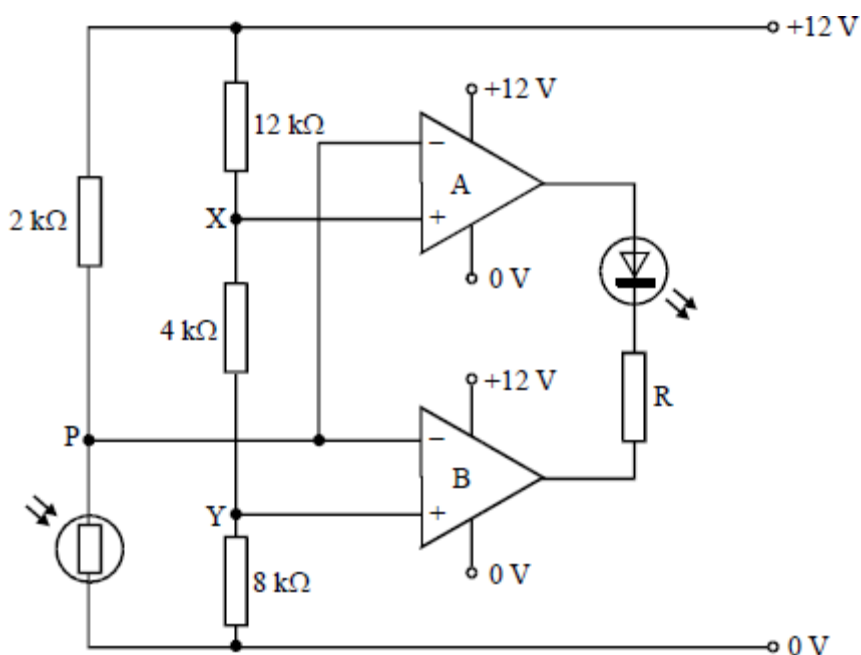
- (b) (i) Draw a circuit diagram of a non-inverting operational amplifier in which negative feedback is used. Label the input voltage and the output voltage. Do **not** show power supplies.

- (ii) Suggest suitable values for the components used in the circuit so that a voltage gain of 12 is obtained.

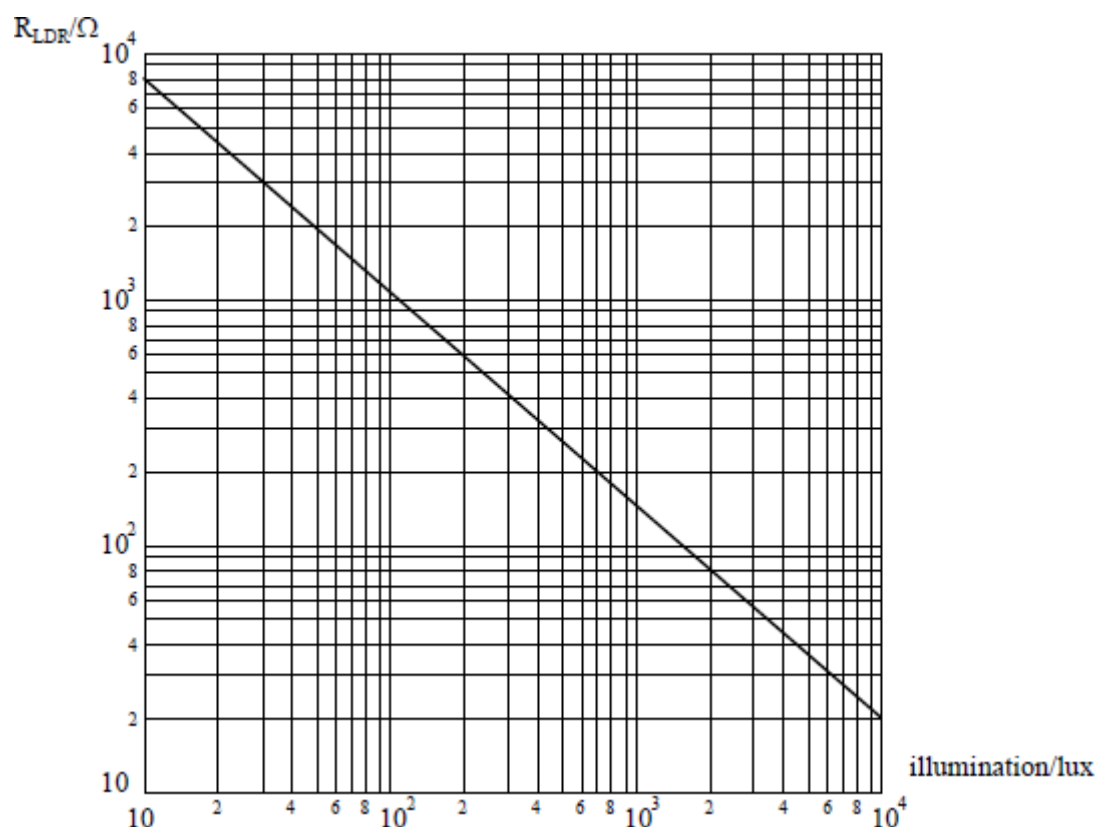
(4)

Q2.

In this voltage comparator circuit the LED lights up only when the illumination falling on the LDR in the resistor network lies between two particular values.



The LDR has the characteristic shown below.



- (a) Give the voltage output values of the operational amplifiers which make a current flow through the LED so that it lights up.

(1)

- (b) Calculate the voltages at points X and Y in the resistor chain.

(2)

- (c) Use the answers to part (b) to determine the two values of the illumination between which the LED will be lit.

(4)

- (d) Explain how the circuit works, making appropriate reference to your calculations in parts (b) and (c).

(4)

(Total 11 marks)