EASTERN UNIVERSITY, SRI LANKA

THIRD EXAMINATION IN SCIENCE - 2007/2008

FIRST SEMESTER (SPECIAL REPEAT)

(FEBRUARY 2010)

PH 301 ELECTRONICS II

Time: 01 hour.

Answer ALL Questions

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1. Describe the properties of an ideal operational amplifier. Discuss how an operational amplifier can be used as:

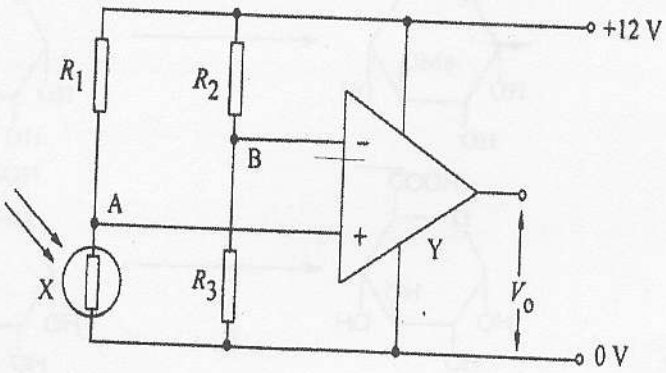
   (a) An inverting amplifier

   (b) An integrator

   Use Operational amplifier summers and integrators to solve the following differential equation.

$$\frac{d^2V}{dt^2} + 3\frac{dV}{dt} + \frac{V}{4} = V_o \cos\omega t$$

The circuit shown in the figure is a voltage comparator



(a) Name the components labeled X, Y, R_2 and R_3.

(b) Explain the purpose of R_2 and R_3 in this circuit.

(c) Discuss the output voltage V_o, of the circuit when

   (i) The voltage at A is greater than the voltage at B.

   (ii) The voltage at A is less than the voltage at B.

(d) If the circuit has a supply voltage of 12 V and draws a current of 15 mA; Calculate the power that the circuit consumes.

2. Explain briefly how a bipolar and a unipolar transistor works. Discuss the input and output characteristics of a transistor.

Find the possible range of values for Ic and Vc in the following silicon transistor circuit, where β is in the range of 200 to 250.

Given that $V_{cc}=15V$, $R_1=1M\Omega$, $R_2=500k\Omega$, $R_c=10k\Omega$, $R_E=10k\Omega$ and $V_{BE}=0.7\ V$.