WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 4th Semester Examination, 2022

ELSACOR08T-ELECTRONICS (CC8)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

1. Answer any ***five*** questions from the following: 2×5 = 10

   (a) What is the cause of slow rate in an OP-AMP? 2

   (b) How does CMRR of OP-AMP vary with frequency? 2

   (c) What is the utility of an unity-gain buffer? 2

   (d) Why are dual power supply voltages provided to an OP-AMP? 2

   (e) Find input impedance of inverting amplifier using OP-AMP. 2

   (f) Why is a stable multivibrator called as free running multivibrator? 2

   (g) Write down the significance of zero output impedance of an ideal OP-AMP. 2

   (h) State any two factors responsible for offset voltage in an OP-AMP. 2

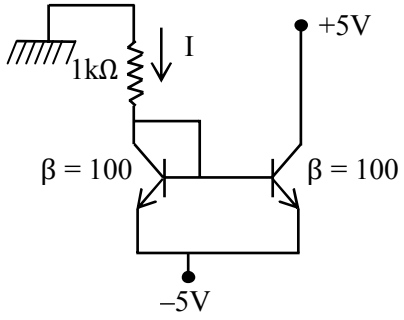
GROUP-B

Answer any *six* questions from the following 5×6 = 30

2. Derive the condition of oscillation in a Wien-bridge oscillator. Hence explain how amplitude stabilization is achieved in an OP-AMP based implementation of the oscillator. 3+2

3. Realise a bistable multivibrator using IC 555 and explain its operation. 2+3

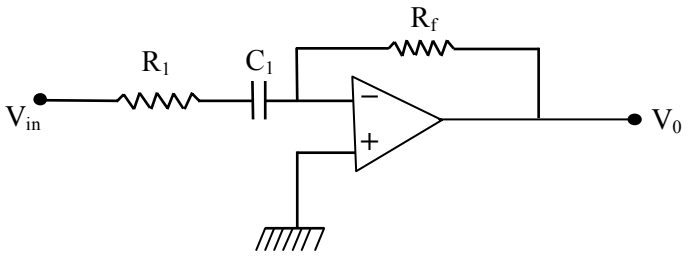
4. (a) Show that the circuit functions as a current mirror and find the value of I. 4



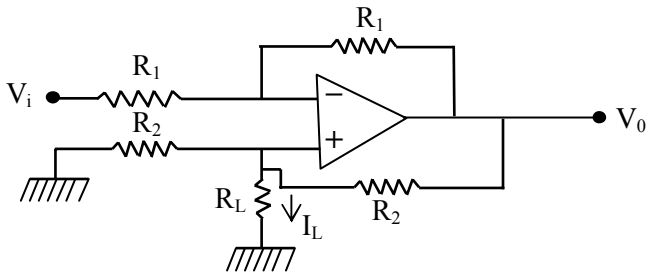
   (b) Define PSRR of an OP-AMP. 1

5. (a) Find expression for the gain of a non-inverting amplifier assuming the gain to be finite. 3

(b) Explain with reason, the type of filter realized by the given circuit. 2



6. (a) Find the value of I_L in the given circuit. 3



(b) What are the unique characteristics of differential amplifier? 2

7. Describe how an OP-AMP can be used as a square-wave generator and find out the expression of frequency of the output. 5

8. (a) Explain with a block diagram, how OP-AMPs can be used for multiplication of two voltages. 3

(b) Draw and explain the transfer characteristics of an OP-AMP. 2

9. (a) Find expression for output voltage of a practical integrator. 3

(b) What are the advantages of active filter over passive filter? 2

10.(a) For a similar gain, explain the advantage of non-inverting mode over non-inverting mode of operation. 2

(b) Draw a labelled block diagram of the different stages of an OP-AMP and explain the function of each stage. 3

11.(a) Design a practical integrator that integrates signals with frequency down to 500 Hz. It produces a peak output of 0.5 V when the input is a sine wave with a peak amplitude of 10 V with a frequency of 10 kHz. 3

(b) Design an active first order low pass butterworth filter with cut-off frequency 1 kHz and for a given gain 3.2 (Given C = 0.1 μF). 2

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

——×——