



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

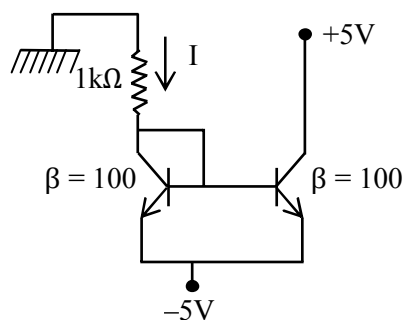
1. Answer any **five** questions from the following: 2×5 = 10
 - (a) What is the cause of slow rate in an OP-AMP? 2
 - (b) How does CMRR of OP-AMP vary with frequency? 2
 - (c) What is the utility of an unity-gain buffer? 2
 - (d) Why are dual power supply voltages provided to an OP-AMP? 2
 - (e) Find 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

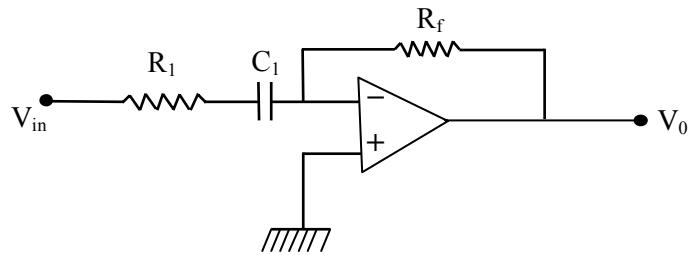
2. Derive the condition of oscillation in a Wien-bridge oscillator. Hence explain how amplitude stabilization is achieved in an OP-AMP based implementation of the oscillator. 3+2
3. Realise a bistable multivibrator using IC 555 and explain its operation. 2+3
4. (a) Show that the circuit functions as 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

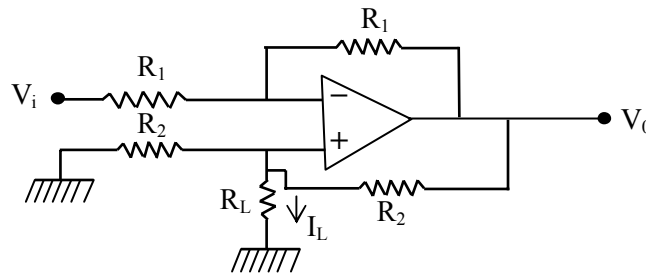
(b) Explain with reason, the type of filter realized by the given circuit.

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 $C = 0.1 \mu\text{F}$).

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.

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