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বিদ্যাসাগর বিশ্ববিদ্যালয়
VIDYASAGAR UNIVERSITY
Question Paper

B.Sc. Honours Examinations 2022

(Under CBCS Pattern)

Semester - IV

Subject : PHYSICS

Paper : C 10 - P

Analog Systems and Applications Lab

Full Marks : 20

Time : 3 Hours

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group - A

Answer any *one* question :

5×1=5

1. Study the VI characteristic of Zener diode. 1+2+2
 - (a) Implementation of circuit.
 - (b) Experimental reading for VI characteristic curve.
 - (c) Draw the V vs. I graph.
2. Write down the theory and circuit diagram to investigate the use of an op amp as an integrator. Calculate the specific value of limiting resistance (R_2) capacitor and other resistor (R_1) connected to inverting input. Capacitance should be such that there would be limiting

P.T.O.

frequency, $f_0 \sim 500\text{Hz}$. Draw the nature of the plot $\frac{V_i}{V_0}$ vs f . How can you determine unknown capacitor from this curve provided $R_1 = 1\text{K}\Omega$? 2+1+1+1

3. Study the performance of a voltage comparator using op-amp. Taking the reference voltage $V_R = 4\text{V}$ at non-inverting terminal, vary the dc input voltage at inverting terminal to get the performance.
- Circuit Implementation.
 - Experimental reading (at least six) for input versus output graph.
 - Draw the input versus output curve.

Group - B

Answer any *one* question :

10×1=10

4. Use the given op-amp as a non-inverting amplifier of gain 11. Study the variation of output voltage for different input voltages in the range -1V to $+1\text{V}$. Take at least six variations including +ve and -ve voltages and plot input voltage vs. output voltage. 1+2+2+3+2
- Working formula.
 - Circuit implementation.
 - Preparation of potential divider circuit.
 - Experimental data for V_{in} vs. V_0
 - Plotting the graph.
5. Study the static output characteristic curves and the transfer characteristic curve of a n-p-n transistor in common emitter configuration at fixed base current and hence determine the ac current gain (h_{fe}). 1+2+2+1+2+1+1
- Working formula.
 - Circuit implementation.
 - Experimental data for output characteristic at fixed base current.
 - Plotting the graph of output characteristic.
 - Experimental data for transfer characteristic curve at fixed V_{CE} .
 - Plotting the graph of transfer characteristic curve.
 - Determine h_{fe} from transfer characteristic curve.