

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination December 2021

B. Tech. in Electrical and Electronic Engineering, Semester V

Course Code: EE102 Analog Circuits

Roll No.

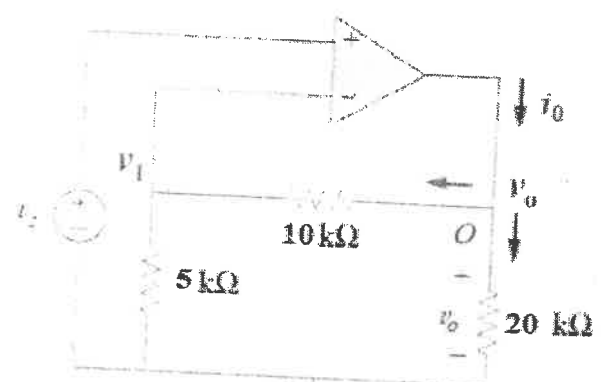
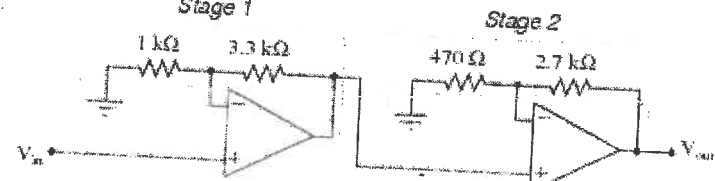
Time: 2:30 hours

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Answer all questions

(1)	Use the ideal op amp model to calculate the closed-loop gain V_o/V_s . Find i_o when $V_s = 5$ V. [4]
	
(2)	Calculate the voltage gain for each stage of this amplifier circuit then calculate the overall voltage gain: [4]
	
(3)	Design an active high-pass filter with a gain of 10, a corner frequency of 20 kHz. Design same filter for new corner frequency of 10 kHz and pass band gain 5. [4]
(4)	For the digital to analog converter using R-2R ladder network method determine [4]
	(i) Size of each step if $R_f = 20$ kΩ. (ii) Output voltage when inputs b_0, b_1, b_2 and b_3 are at 2 V. (iii) Output voltage when inputs $b_0 = b_1 = b_2 = 5$ V and $b_3 = 0$.
(5)	Design a Colpitts oscillator to produce a sine wave of frequency 1 GHz and fraction of feedback is 3 and uses an inductance of $L = 1$ mH. [4]
(6)	From the circuit shown in the below figure has an ideal op-amp, determine [4]

	(a) Type of oscillator (b) Frequency of oscillation (c) Relation between R1 and R2 (d) Feedback gain factor	
(7)	Develop a current amplifier has input resistance of $4\text{ k}\Omega$ and output impedance of $80\text{ k}\Omega$. It is used in negative feedback circuit with 10% feedback and open loop gain is 90. For a closed loop amplifier, calculate (a) Closed loop input impedance (b) Output impedance (c) Lower cut-off frequency (d) Upper cut-off frequency (e) Bandwidth	[4]
(8)	Draw the block diagram of Voltage sampling – Shunt Mixing feedback configuration and Write an expression for transfer gain, input resistance and output resistance.	[2]