

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 2366

F-4

Your Roll No.....

Unique Paper Code : 2511404

Name of the Course : **B. Tech Instrumentation**

Name of the Paper : Linear Integrated Circuit

Semester : IV

Duration : 3 Hours

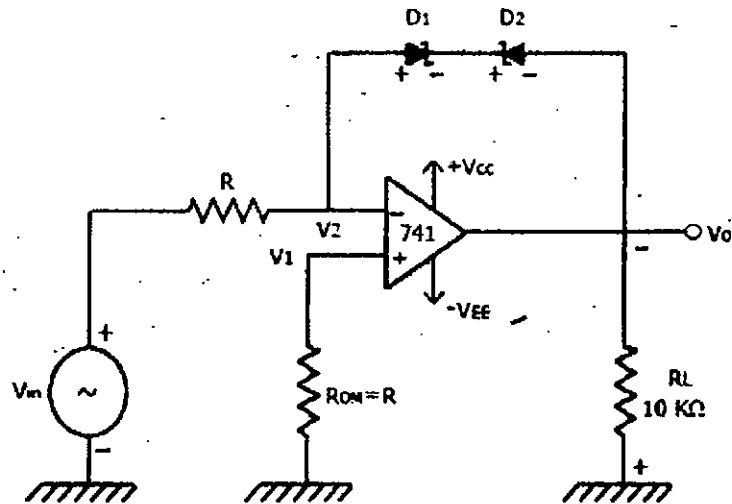
Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all.
3. Question No. 1 is compulsory.
4. Use of scientific calculator is allowed.

1. (a) What is the purpose of level translator in the operational Amplifier ? (3)
- (b) A wein bridge oscillator uses $R = 4.7 \text{ K}\Omega$, $C = 0.01 \text{ }\mu\text{F}$, and $R_F = 2R_1$. What is the frequency of oscillation ? (3)
- (c) What are Voltage limiters ? Write their applications. (3)
- (d) State any two applications of Monostable multivibrators. (3)
- (e) What is All Pass Filter ? Write its application. (3)

2. (a) Give the AC analysis for the Dual Input unbalanced Output differential Amplifier. Derive the expression for voltage gain, Input and output Resistance. (8)
- (b) Design a summing Amplifier that produces the output voltage
- $$V_{OUT} = V_1 + V_2 - V_3 \quad (4)$$
- (c) Derive the expression for gain of Inverting Amplifier. (3)
3. (a) Explain the working of square wave generator with the help of circuit diagram. Derive the expression of the frequency f of generated wave. (8)
- (b) Draw the circuit of voltage to current converter with grounded load. (4)
- (c) Evaluate the SVRR of the Operational Amplifier whose V_{io} gets changed by $450 \mu\text{V}$ as the supply voltage changes by 3V . Also represent the SVRR in db. (3)
4. (a) Design a second order High Pass Filter, with lower cut off frequency = 3 KHz . Compare the frequency response of low pass filter of 1^{st} and 2^{nd} order. (5)
- (b) Draw the circuit diagram and Explain the working of Schmitt trigger. (5)
- (c) Explain the working of circuit given below if input is a sine wave with peak. Voltage V_p and frequency 1 KHz . Also plot the input and output waveform for it. (5)



5. (a) Explain the working of Integrator circuit and its frequency response. Also indicate the problem faced by it and mention the remedies to overcome it. (8)
- (b) What is Band Reject filter? Plot its frequency response if $f_H = 300$ Hz and $f_L = 1500$ Hz. (4)
- (c) The input to the practical differentiator is triangular wave with 6V peak to peak at 2 KHz. Draw the output waveform if $R_F C_1 = 1$ ms and $F_F = 10R_1$. (3)
6. (a) For an Astablemultivibrator, $R_A = 7$ K Ω , $R_B = 4$ K Ω and $C = 0.01$ μ F. Calculate (a) Positive pulse width (b) Negative pulse width, (c) Free running frequency (d) Duty cycle. (7)
- (b) Draw the circuit and also sketch input and output waveforms of a small signal half wave rectifier using op-amp. (5)
- (c) What are voltage regulators? Why are switching regulators more efficient than linear regulators? (3)

7. (a) Explain the working of 8-bit Successive Approximation A/D converter considering arbitrary value of input analog signal. (7)
- (b) What is VCO ? Draw its block diagram. (5)
- (c) Evaluate the analog output voltage, if the digital input 1001 is applied to the 4-bit binary weighted register type D/A converter, whose $R_f = 1 \text{ K}\Omega$ and the input resistance, $R_n = R_f/2^{N-n}$ when seen from different inputs (N represents the total number of bits while n represents the bit position). (3)