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Question Paper Code: R4408

B.E. / B.Tech. DEGREE EXAMINATION, APRIL/MAY 2025

Fourth Semester

Electronics and Communication Engineering

R21UEC408 - PRINCIPLES OF LINEAR INTEGRATED CIRCUITS

(Regulations R2021)

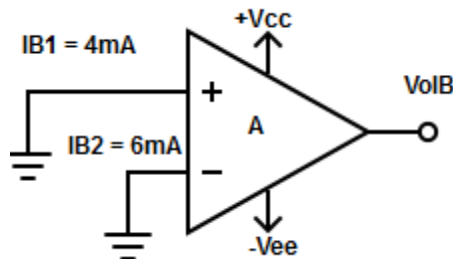
Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5Marks)

- ICs used for industrial application will have temperature range from CO1-U
a) -55° to $+85^{\circ}\text{C}$ b) 90° to 155°C c) 10° to 100°C d) -20° to $+85^{\circ}\text{C}$
- Find the input bias current for the circuit given below CO2-App



- a) 10mA b) 5mA c) 2mA d) 6mA
- An inverting amplifier with gain 1 have different input voltage: CO3-App
1.2v, 3.2v and 4.2v. Find the output voltage?
a) 4.2v b) 8.6v c) -4.2v d) -8.6v
- How to achieve 50% duty cycle in adjustable rectangular wave CO4-App
generator? (Assume $R_1 \rightarrow$ Resistor connected between supply and
discharge and $R_2 \rightarrow$ Resistor connected between discharge and trigger
input.)
a) $R_1 < R_2$ b) $R_1 > R_2$ c) $R_1 = R_2$ d) $R_1 \geq R_2$

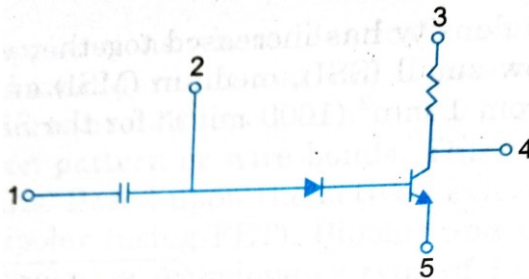
5. The smallest resistor in a 12 bit weighted resistor DAC is $2.5\text{k}\Omega$, what will be the largest resistor value? CO6-App
- a) $40.96\text{M}\Omega$ b) $10.24\text{M}\Omega$ c) $61.44\text{M}\Omega$ d) $18.43\text{M}\Omega$

PART – B (5 x 3= 15 Marks)

6. What is need of lithography in IC fabrication? CO1-U
7. The output of an operational amplifier is 5V peak sine wave whose slew rate is $0.5\text{V}/\mu\text{s}$. Find the maximum allowable frequency of the signal CO2-App
8. Draw the output waveform of a clamper circuit with input signal amplitude of 5V and reference voltage of $+2\text{V}$ CO4-App
9. Give reasons for the purpose of connecting a capacitor at the input and output side of an IC voltage regulator? CO1-U
10. What is the output of a 6 bit ladder D/A converter when it has an input of 101001 ? For $1 = 10\text{V}$ and $0 = 0\text{V}$ CO6-App

PART – C (5 x 16= 80 Marks)

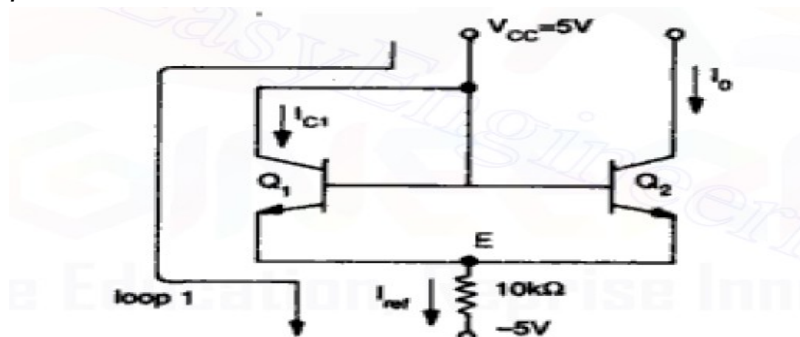
11. (a) CO2-App (16)



Fabricate the above circuit using Basic planar process.

Or

- (b) Design the Monolithic NPN transistor using IC fabrication process. CO2-App (16)
12. (a) For the circuit shown in fig. Analyze the value of I_o for $\beta=100$ & $\beta=150$. Assume $V_{BE} = 0.7\text{V}$ CO2-App (16)



Or

- (b) i) Design an op – Amp with gain of -10 and input resistance equal to 10 k Ω . CO2-App (16)
 ii) Design an op – Amp with gain of + 5 and input resistance equal to 5 k Ω .
13. (a) Design a adder and subtractor using Op-Amp. Find Vo of circuits for following inputs. CO3-App (16)
 i) V1=5V
 ii) V2=3V
 iii) V3=4V
- Or
- (b) Design a regenerative comparator that produces square wave from input sine wave. CO3-App (16)
14. (a) Design a Astable multivibrator using IC 555 with its frequency of oscillation is 1 KHz. CO4-App (16)
- Or
- (b) Determine the change in DC control voltage Vc during lock, if input signal frequency fs = 20 KHz, the free running frequency is 21 KHz and the V/F transfer coefficient of VCO is 4 KHz and analyze the same with 30 kHz input signal. CO4-App (16)
15. (a) Design a 3 bit output Flash type ADC with neat diagram. CO6- App (16)
- Or
- (b) Design a 3 bit weighted resistor DAC with neat diagram. CO6- App (16)

