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**Question Paper Code: U4404**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2024

Fourth Semester

Electronics and Communication Engineering

21UEC404-LINEAR INTEGRATED CIRCUITS

(Regulations 2021)

Duration: Three hours

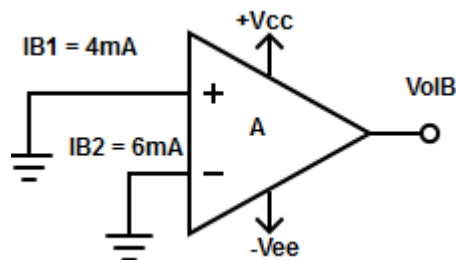
Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Find the input bias current for the circuit given below

CO2-App



- (a) 10mA                      (b) 5mA                      (c) 2mA                      (d) 6mA
2. Find the gain of the voltage to current converter with grounded load?                      CO2-App
- (a) 2                      (b) 1                      (c)  $\infty$                       (d) 0
3. In a D-A converter with binary weighted resistor, a desired step size can be obtained by                      CO1-U
- (a) Selecting proper value of  $V_{FS}$                       (b) Selecting proper value of R
- (c) Selecting proper value of  $R_F$                       (d) All of the mentioned
4. The output of a particular Op-amp increases 8V in 12 $\mu$ s. The slew rate is                      CO2-App
- .....
- (a) 90 v/ $\mu$ s                      (b) 0.67 v/ $\mu$ s                      (c) 1.5 v/ $\mu$ s                      (d) 2.5 v/ $\mu$ s

5. Given the lower and higher cut-off frequency of a band-pass filter are 2.5kHz and 10kHz. Determine its bandwidth. CO1-U
- (a)750 Hz                      (b)7500 Hz                      (c)75000 Hz                      (d)750kHz

PART – B (5 x 3= 15Marks)

6. A differential amplifier has a differential voltage gain of 2000 and common mode gain of 0.2. Determine CMRR in dB. CO2- App
7. Draw the output waveform of a clipper circuit with input signal amplitude of 5V and reference voltage of +2V CO1-U
8. Draw the output waveform of a clamper circuit with input signal amplitude of 5V and reference voltage of +2V CO2-App
9. If the analog signal  $V_a$  is +4.129V .Find the equivalent digital number using dual slope ADC. 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 V and 0 = 0V CO3-App

PART – C (5 x 16= 80Marks)

11. (a) Design a i) constant current source ii) Widlar current source for generating a constant current of  $I_o=12\mu A$ . Assume  $V_{cc}=15V$ ,  $V_{be}=0.7 V$ ,  $\beta=120$ ,  $V_T=25mV$ . Find  $R_1$ . CO2- App (16)
- Or
- (b) (i) Design an op – Amp with gain of -10 and input resistance equal to 10 k $\Omega$ . CO2- App (8)
- (ii) Design an op – Amp with gain of + 5 and input resistance equal to 5 k $\Omega$ . CO2- App (8)
12. (a) Design a circuit which is used in industry application to amplify the low input signal. CO2-App (16)
- Or
- (b) Design the circuits which produce triangular and spike wave output for square input signal. CO2-App (16)
13. (a) Design an Amplifier circuit to measure the low input signal which is used in industrial and consumer applications. CO2-App (16)
- Or
- (b) Design the circuits which produce triangular and spike wave output for square input signal. CO2-App (16)

14. (a) Discuss in detail about the successive approximation ADC with neat diagram. CO1- U (16)
- Or
- (b) Discuss in detail about the R-2R ladder type DAC with neat diagram. CO1-U (16)
15. (a) i) The basic step of a 9 bit DAC is 10.3 mV. If 000000000 represents 0V, find output is produced if the input is 101101111. CO3- App (16)  
ii) Calculate the values of the LSB, MSB and full scale output for an 8 bit DAC for the 0 to 10 V range.
- Or
- (b) Find out the output voltage would be produced by DAC whose output range is 0 to 10 V and whose input binary number is CO3-App (16)
- i) 10 (for a 2 bit DAC )
  - ii) 0110 (for a 4 bit DAC )
  - iii) 10111100 (for a 8 bit DAC )

