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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR  
(AUTONOMOUS)

B.Tech II Year I Semester Regular &amp; Supplementary Examinations March-2023

ANALOG ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 a Define feedback and illustrate the basic concept of Feedback with suitable block diagram. CO1 L2 6M
- b A voltage series negative feedback amplifier has a voltage gain without feedback of  $A=500$ , input resistance  $R_i=3\text{ k}\Omega$ , output resistance  $R_o=20\text{ k}\Omega$  and feedback ratio  $\beta=0.01$ . Calculate the voltage gain  $A_f$ , input resistance and output resistance of the amplifier with feedback. CO3 L2 6M

OR

- 2 a Show that how a negative feedback reduces gain of an amplifier. CO1 L1 6M
- b An amplifier has open loop gain 1000 and feedback ratio of 0.04, if the open loop gain changes by 10% due to temperature, find the percentage change in the gain of the amplifier feedback. CO3 L3 6M

**UNIT-II**

- 3 a Define Oscillator and explain its principle of operation. CO1 L2 6M
- b In a transistorized Hartley, oscillator the two inductances are 2mH and 20 $\mu$ H. While the frequency is to be changed from 950 kHz to 2050 kHz. Calculate the range over which the capacitor is to be varied. CO4 L4 6M

OR

- 4 a Determine the condition for sustained oscillations for an RC phase shift Oscillator with necessary circuit diagrams. CO2 L3 6M
- b Draw the circuit diagram of Colpitts oscillator using BJT and derive the expression for frequency of oscillations CO1 L1 6M

**UNIT-III**

- 5 a Explain the basic information and pin configuration of an op-amp. CO1 L2 6M
- b Derive the expression for gain of Differential amplifier with two op-amps. CO5 L2 6M

OR

- 6 a What is voltage follower? What are its features and applications? CO1 L1 6M
- b Draw and explain frequency response of practical op-amp. CO1 L2 6M

**UNIT-IV**

- 7 a Design and explain the operation of inverting summing amplifier. CO3 L3 6M  
 b Draw the input-output waveforms and frequency response of integrator CO1 L1 6M

OR

- 8 a Draw an op-amp circuit whose output is  $V_o = (V_3 + V_4) - (V_1 + V_2)$ . CO1 L3 6M  
 b Derive the equation for frequency of oscillation of astable multivibrator CO4 L3 6M  
 using op-amp.

**UNIT-V**

- 9 a Define active filter and give its characteristics. CO2 L4 6M  
 b The basic step of a 9 bit DAC is 10.3 mV. If "000000000" represents 0 V. CO4 L1 6M  
 What output is produced if the input is "101101111"?

OR

- 10 a Explain the first order high pass butter worth filter with a neat circuit CO2 L2 6M  
 diagram.  
 b Design an inverted R-2R ladder DAC for digital input word 001. CO2 L2 6M

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