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

B.Tech II Year II Semester Supplementary Examinations February-2022

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 Prove that bandwidth of an amplifier can be extended by using negative feedback amplifier? L5 6M
- b An amplifier has voltage gain with feedback of 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2%, determine the value of open-loop gain, A and feedback ratio, β . L4 6M

OR

- 2 a Determine the input and output resistances of Current Shunt feedback amplifier. L2 6M
- b An amplifier has midband voltage gain of 1000 with $f_L=50\text{Hz}$, $f_h=50\text{kHz}$, if 5% of feedback is applied then calculate f_L, f_h with feedback L4 6M

UNIT-II

- 3 a Explain the working principle of Wein-bridge oscillator using BJT and derive the expression for frequency of oscillations. L2 6M
- b In a Wein-bridge oscillator, if the value of R is 100 K Ω , and frequency of oscillation is 10 KHz, Examine the value of capacitor C. L2 6M

OR

- 4 Explain Hartley oscillator using BJT and derive the expression for its frequency of oscillations and condition for sustained oscillations.. L2 12M

UNIT-III

- 5 a Draw the various functional blocks of an operational amplifier IC. Explain each block. L2 6M
- b Draw the equivalent circuit diagram of Op amp and derive the expression for gain of inverting amplifier. L2 6M

OR

- 6 a List out the ideal characteristics of an operational amplifier. L4 6M
- b An op-amp has a slew rate of 2V/ μs . What is the maximum frequency of an output sinusoid of peak value 5V at which the distortion sets in due to the slew rate limitation L4 6M

UNIT-IV

- 7 a Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 kHz. L3 6M
- b Explain sample and hold circuit using op-amp L2 6M

OR

- 8 Explain the operation of triangular wave generator with neat circuit diagram and derive the equation for output frequency L3 12M

UNIT-V

- 9 Design a highpass filter at a cut-of frequency of 10kHz with passband gain 1.5 and plot frequency response of this circuit. **L3 12M**

OR

- 10 a Draw and explain the weighted resistor DAC **L2 6M**
b An 8-bit Analog to Digital converter has a supply voltage of +12 volts. **L5 6M**
Calculate:
i) The voltage step size for LSB.
ii) The value of analog input voltage for a digital output of 01001011.

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