USN | | | | | | | | | | |

10EE56

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Linear IC's and Application

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting atleast TWO questions from each part.*
2. Use of standard resistance/capacitance chart permitted.

PART – A

1 a. Sketch the circuit of high input impedance capacitor coupled voltage follower. Develop the equation for input impedance list design steps. **(08 Marks)**

b. A capacitor coupled non-inverting amplifier is to be designed with $A_v = 120$ and $V_L = 4.2V$. Load resistance is 8.2KΩ and lower cut off frequency is 60Hz. Design the circuit using 715 op-amp [Assume $I_{B(max)} = 1.5\mu A$] **(07 Marks)**

c. What is setting upper cut-off frequency? Why is it necessary explain how it can be achieved for an inverting amplifier. **(05 Marks)**

2 a. Explain : i) phase lag ii) phase lead compensation methods for op-amp circuits with lower closed loop gains. **(08 Marks)**

b. Explain effect of slew rate on :
i) Band-width and output amplitude
ii) Output pulse rise time and amplitude. **(08 Marks)**

c. A 741 op-amp is used as an inverting amplifier with a gain of 50. The voltage gain versus frequency plot is flat upto 20KHz. What is peak to peak sine wave input that can be amplified without any distortion. Assume SR = 0.5V/μsec. **(04 Marks)**

3 a. Draw on high input impedance full-wave precision rectifier. Show various waveforms. Write down appropriate equations to show that full wave rectification is achieved. **(09 Marks)**

b. Explain with a neat circuit working of a precision clamping circuit. Show how output can be biased at any desired level. **(06 Marks)**

c. With a neat circuit, explain working of a sample and hold circuit. **(05 Marks)**

4 a. With a neat circuit, explain working of an inverting Schmitt trigger. Draw waveforms and transfer char. Give equations for designing. **(07 Marks)**

b. An inverting Schmitt trigger with UTP = 0 and $V_H = 0.2V$ converts a 1KHz sine wave of amplitude 4V peak to peak to a rectangular wave. Determine T_{ON} and T_{off}. **(06 Marks)**

c. Draw a monostable multivibrator circuit and draw various waveforms at different points of the circuit write an expression for pulse width of the output. **(07 Marks)**

PART – B

5 a. Compare an RC phase shift oscillator with Wien bridge oscillator. **(06 Marks)**

b. Draw a triangular/rectangular wave generator circuit. Explain how frequency and duty cycle control is achieved. **(09 Marks)**

c. Design a RC phase shift oscillator, to give a maximum output of ±3V at a frequency of 6KHz. Include distortion minimization adjustment. **(05 Marks)**

6 a. Compare a wide band filter with a narrow band filter. **(06 Marks)**

b. Explain a second order high pass filter. List out design steps show the frequency response. **(08 Marks)**

c. Using 741 op-amp design a bandpass filter with centre frequency at 1KHz and passband to be approximately ±33Hz on each of 1KHz. **(06 Marks)**

7 a. What is a power amplifier? List features of LM380 audio amplifier. **(06 Marks)**

b. List advantages of switched capacitor filter and explain how a switched capacitor can simulate a resistor. **(07 Marks)**

c. Explain phase locked loop with block diagram. define the terms :
i) lock range ii) capture range. **(07 Marks)**

8 a. Define terms :
i) Line regulation
ii) Load regulation
iii) Ripple rejection, applied to voltage regulation. **(06 Marks)**

b. With a neat circuit explain operation of adjustable output regulator. **(06 Marks)**

c. A positive voltage regulator is to produce an output voltage of 2V. Design the circuit using LM217 IC voltage regulator. **(08 Marks)**

* * * * *