

Scheme-G

Sample Test Paper- I

Course Name :- Diploma in Electronics and Telecommunication Engineering

Course Code :- ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester :-Fourth

17445

Subject Title :- Linear Integrated Circuits

Marks :- 25

Time:- 1 hour

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1. Attempt any THREE

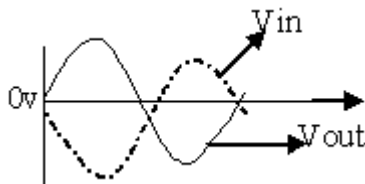
(09 Marks)

- a. Draw and describe ideal transfer characteristics of op-amp.
- b. Define operational amplifier. Draw block diagram of op-amp.
- c. Draw the op-amp based circuit diagram to provide following operation
 $V_o=5V$ and $V_{in}= -1V$
- d. Define output offset voltage. Describe how offset nulling is achieved in op-amp.

Q2. Attempt any TWO

(08 Marks)

- a. Define:
 - i. SVRR
 - ii. CMRR
 - iii. Input offset current
 - iv. Output voltage swing
- b. Design and draw op-amp based circuit for following operation,
Fig



- c. Draw three input summing amplifier using op-amp. Describe how it can be used as scaling

amplifier.

Q3. Attempt any TWO

(08 Marks)

- a. Draw op-amp based circuit for following operation

$$V_o = -(V_1 + V_2 + V_3)/3$$

Also state the value of input resistor if $R_f = 3K\Omega$

- b. List any four advantages of instrumentation amplifier
c. Draw and describe I to V converter using op-amp

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Sample Test Paper- II

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Course Code :- ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester :-Fourth

17445

Subject Title :- Linear Integrated Circuits

Marks :- 25

Time:- 1 hour

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1.Attempt any THREE

(09 Marks)

- a. Draw Non-inverting Zero Crossing Detector (ZCD). State any two applications of ZCD.
- b. Draw second order low pass filter and write expression for cut off frequency.
- c. State the need of all pass filters and draw the circuit diagram of it.
- d. Draw pin diagram of IC 555 and state function of reset pin.

Q2.Attempt any TWO (08 Marks)

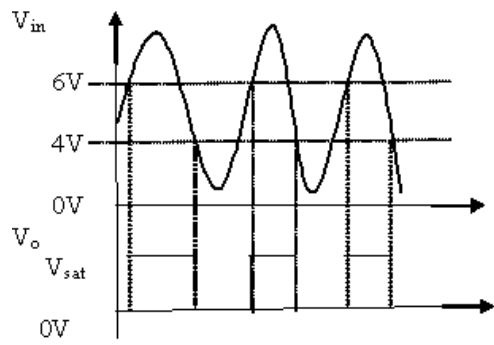
- a. Describe the operation of phase detector with the help of circuit diagram.
- b. Design second order Butterworth high pass filter with cut off frequency 20 KHz
- c. Draw ideal and practical response of following
 - i. LPF
 - ii. HPF
 - iii. Wide BPF
 - iv. Wide BRF

Q3.Attempt any TWO

(08 Marks)

- a. Draw block diagram and describe operation of frequency multiplier using PLL.
- b. Draw and describe touch plate switch using IC 555
- c. Suggest and draw IC 555 based circuit with supply voltage $V_{cc} = 6V$ for following operation.

Fig



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Sample Question Paper

Course Name :- Diploma in Electronics and Telecommunication Engineering.

Course Code :- ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester :-Fourth

17445

Subject Title :- Linear Integrated Circuits

Marks :- 100

Time:- 3 hour

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1.A) Attempt any SIX

(12 Marks)

- a. Define:
- i) Input offset voltage
 - ii) Slew Rate
- b. Draw circuit diagram of basic differentiator using op-amp
- c. List any four specification of IC LM 324
- d. State the need of signal conditioning (any two points)
- e. Define sample period and hold period with reference to sample and hold circuit
- f. Define:
- i) Q factor of filter
 - ii) Passband of filter
- g. Draw circuit diagram of narrow band reject filter using op-amp
- h. State functions of following pins of IC 555
- i) Threshold
 - ii) Discharge

Q1.B) Attempt any TWO**(08 Marks)**

- a. Describe the function of input stage and level shifting stage of op-amp with its block diagram
- b. State ideal values of following parameters of op-amp as well as state typical values of following parameters of op-amp IC741
- c. Describe the term dual i/p balanced o/p differential amplifier and dual i/p unbalanced o/p differential amplifier and draw single i/p unbalanced o/p differential amplifier

Q2. Attempt any FOUR**(16 Marks)**

- a. Compare open loop and closed loop configuration of op-amp on following basis
 - i. Circuit Diagram
 - ii. Gain
 - iii. Bandwidth
 - iv. Application
- b. Describe virtual ground and virtual short concept with reference to op-amp.
- c. Draw closed loop Non-Inverting amplifier using op-amp and derive expression for its gain.
- d. Derive the expression for relation between i/p and o/p of basic integrator and draw basic integrator.
- e. Design and draw the circuit for the following operation using op-amp
$$V_o = 2V_1 + V_2 - 5V_3$$
- f. Suggest op-amp based circuit to convert square wave to triangular wave and draw the circuit diagram with input and output waveform.

Q3. Attempt any FOUR**(16 Marks)**

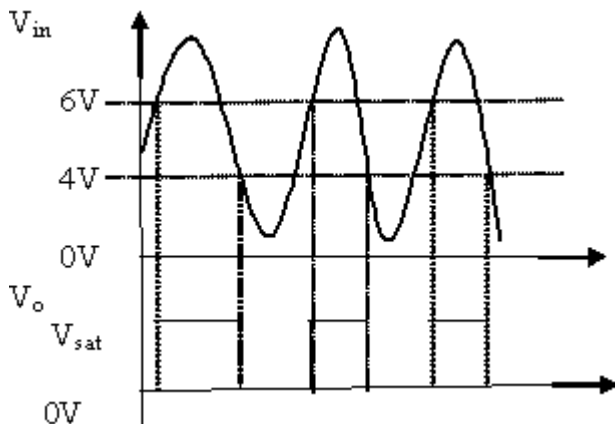
- a. Describe the operation of instrumentation amplifier with transducer bridge with help of neat circuit diagram.
- b. Draw circuit diagram of grounded load type V-I converter and derive expression for its output.
- c. State the needs of peak to peak detector and draw its circuit diagram.
- d. Draw and describe following op-amp based operation using log and antilog amplifier
$$V_o = V_1 \times V_2$$

- e. Draw circuit diagram and input output waveforms of inverting ZCD and non-inverting ZCD
- f. Describe the operation of op-amp based Schmitt trigger for sine to square wave conversion with the help of its circuit diagram

Q4. Attempt any FOUR

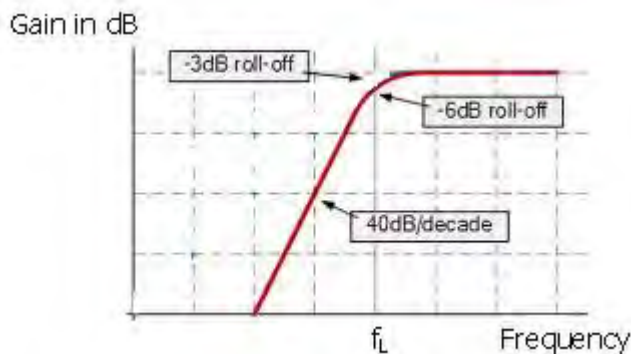
(16 Marks)

A Suggest an OPAMP based circuit to perform below operation



b. Design and draw low pass filter with cut off frequency 2 KHz and passband gain of 2.

C Suggest and draw op-amp based circuit using Butterworth filter to fulfill following response



- d. Describe the operation of wide bandpass filter with the help of circuit diagram
- e. Draw the circuit diagram of op-amp based filter circuit which provides following response and describe its operation.
- f. Classify the op-amp filters on following basis:

- 1.Components used
- 2.Frequency range
3. Frequency response
- 4.Nature of passband and stopband

Q5. Attempt any FOUR

(16 Marks)

- a. Draw the block diagram of SE 555.State the function of both internal transistors in IC 555.
- b. Draw and describe the operation of water level controller using IC 555.
- c. Draw and describe the operation of frequency divider using IC 555.
- d. Describe the operation of phase detector and role of VCO in PLL.
- e. Define and state the expression for lock range and capture range of PLL.
- f. Describe with the help of block diagram the operation of FM demodulator using PLL.

Q6. Attempt any FOUR

(16 Marks)

- a. Draw the block diagram of VCO using IC 555.Describe how output frequency varies with the variation in voltage applied to pin 5 of IC 555.
- b. Draw the circuit diagram of square wave generator using IC 555. State the purpose of external diode used in the circuit and state expression of it's output frequency.
- c. Design and draw monostable multivibrator using IC555 with $T_p=1\text{ms}$.
- d. Design and draw op-amp based Wein Bridge oscillator for frequency 1KHz.
- e. Draw and describe operation of Bistable multivibrator using op-amp.
- f. How much is overall phase shift in op-amp based phase shift oscillator and how it is achieved. Draw it's circuit diagram.