

w.e.f. 2016-17
B.Sc. Electronics Syllabus under CBCS
(revised in April 2016)

SEMESTER – IV

PAPER – 4

Analog and Digital IC-Applications

Unit – I (10hrs)

OPERATIONAL AMPLIFIERS: Definition, Basic op-amp Ideal op-amp, Block diagram of op-amp, inverting, noninverting, virtual ground, Adders, subtractors, summing amplifier, voltage follower, op-amp parameters, voltage to current convertor, integrator, differentiator, differential amplifier, Logarithmic amplifier.

Unit- II (15 hrs)

OP-AMP CIRCUITS: voltage regulator, comparator, zero-cross detecting circuit, instrumentational amplifier, multivibrators-astable, monostable, Bi-stable, Schmitt trigger. sine wave generator, square wave generator, triangular wave generator, Active filters(Basics)-low pass, high pass, band pass filters

IC-555 –functional block diagram and mention its applications

Unit-III (15hrs):

COMBINATIONAL & SEQUENTIAL LOGIC CIRCUITS (IC-Applications):

Design of Code convertor: BCD to Seven Segment, BCD to Grey, Grey to Binary.

Design of Counters using excitation tables: Mod-N counters (Asynchronous & synchronous), Presettable Binary Up/Down Counter. Design of Universal Shift Register

UNIT-IV (10hrs)

DATA CONVERTERS:

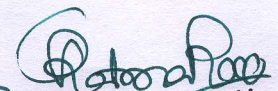
D/A converter: Basic principles of DAC, R-2R Ladder network, Binary Weighted, Specifications of DAC. A/D converter: Basic principles of ADC, Successive Approximation ADC, Single slope and dual slope converter, Sigma-delta ADC, Specifications of ADC.

UNIT-V (10hrs)

DIGITAL SYSTEM INTERFACING AND APPLICATIONS: interfacing of LEDs

Applications of Counters: Digital Clock, Frequency counter

Applications of Shift Registers: Parallel to Serial, Serial to Parallel, UART


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TEXT BOOKS:

1. G.K.Kharate-Digital electronics-oxford university press
2. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
3. Op Amp and Linear Integrated Circuits By Ramakant Gaykwad
4. Linear Integrated Circuits By Roy Choudary

Reference Books :

1. Jacob Millan ,Micro Electronics,McGraw Hill.
2. Mithal G K, Electronic Devices and Circuits Thana Publishers.
3. Allan Motter shead ,Electronic Devices and Circuits – An Introduction- Prentice Hall

Electronics Lab - 4

(Analog and digital ic-applications)

LAB LIST:

1. Op-Amp as inverting and non-inverting
2. Op-Amp as integrator and differentiator
3. Op-Amp as voltage to current converter
4. Op-Amp as sine wave generator (Wien bridge oscillator)
5. Op-Amp as square wave generator
6. Schmitt trigger using IC-555 timer
7. Binary to Grey and Grey to Binary converter
8. Study of pre-settable binary up/down counter
9. BCD to Seven segment decoder 7447/7448.

Lab experiments are to be done on breadboard and simulation software (using Multisim/Microsim) and output values are to be compared and justified for variation.

MODEL PAPER
B.Sc (Three year) Degree Examinations.
SEMISTER-IV ELECTRONICS
Paper-IV ANALOG& DIGITAL I.C APPLICATIONS

Time: 3 Hrs
MaxMarks:75

PART-A

Answer any FIVE Questions

5x5 = 25Marks.

- 1.Explain the concept of virtual ground in OP-AMP?
- 2.Define slew rate of OP-AMP and derive slew rate expression for sinusoidal input?
- 3.Describe the working of inverting comparator using OP-AMP?
- 4.Draw OP-AMP Integrator circuit and explain how it works?
- 5.With the help of logic diagram explain about Gray -to- Binary code converter?
- 6.Implement a Divide-by-7 counter using IC7490 Decade counter?
- 7.Write about the specifications that help in selecting an A/D converter?
- 8.Explain how a shift register can be used as an UART?

PART-B

Answer ALL Questions

10X5 =50marks.

- 9.a)With a neat circuit diagram explain the working of R-2R ladder type D/A converter?
(OR)
b)Give a detailed explanation on the working of successive approximation A/D converter?
- 10.a)Draw the OP-AMP inverting & non-inverting amplifier configurations. Explain their working and obtain expressions for gain?
(OR)
b)Draw Op-Amp Integrator circuit. Explain its working and frequency response ?
- 11.a)Give the circuit for OP-AMP triangular wave form generator. Explain its operation and obtain expression for frequency of triangular output?
(OR)
b)Describe the working of IC555 in Astable mode. Obtain expression for frequency of oscillations?
- 12.a)Design BCD to seven segment code converter using K-map reduction method. Give its logic diagram?
(OR)
b)With the help of J-K FF excitation table, design a synchronous Mod-5 counter?
- 13.a)With simplified logic diagram describe the operation of Digital clock?
(OR)
b)Explain how shift register works as serial to parallel and parallel to serial converter?