

# S.V.UNIVERSITY,TIRUPATI

B.Sc- ELECTRONICS-SYLLABUS

SEMESTER: II

PAPER 2 –ELECTRONIC DEVICES&CIRCUITS(60hrs) (w. e .f-2015-16)

## **UNIT I(12hrs)**

### **JUNCTION DIODES**

PN junction diode – P-N junction theory-depletion region, barrier potential, working in forward& reverse bias condition, Junction capacitance, Diode current equation (no derivation), Effect of temperature on reverse saturation current, V-I Characteristics , Zener and Avalanche Break down, Zener diode - V-I characteristics regulated power supply using Zener diode, Varactor Diode, Tunnel Diode – Principle, Working& Applications.

## **UNIT II(16hrs)**

### **BIPOLAR JUNCTION TRANSISTORS (BJT)**

PNP and NPN transistors, current components in BJT, BJT static characteristics (Input and Output), Early effect, CB,CE,CC Configurations (Cut-off, Active and saturation regions) , h-parameters, h-parameter equivalent circuit. Determination of h-parameters from the characteristics, Concept of amplification-voltage and current amplifier. Biasing and load line analysis, Fixed bias , voltage divider bias arrangements, The C.E amplifier-analysis and parameters, Transistor as a switch.

## **UNIT III(12hrs)**

### **FIELD EFFECT TRANSISTORS&UJT**

FET - Construction - Working – Drain&Transfer characteristics –Parameters of FET – FET as an amplifier-MOSFET-Enhancement MOSFET –Depletion MOSFET –Construction& Working- Drain characteristics of MOSFET –Comparison of FET&BJT and JFET&MOSFET.  
UJT Construction-working, V-I Characteristics

## **UNIT I(8hrs)V**

### **PHOTO ELECTRIC DEVICES**

Structure and operation, characteristics, spectral response and applications of LDR, Photo Voltaic cell, Photo diode, Photo transistor, LED and LCD

## **UNIT V (12hrs)**

### **POWER SUPPLIES**

Rectifiers – Half wave, full wave and bridge rectifiers – Efficiency – Ripple factor – Regulation  
Types of filter- Choke input ( Inductor) filter – shunt capacitor filter –L-Section and  $\pi$  section filters — Voltage regulators- Transistor Series and shunt regulators – Block diagram of regulated

power supply, Three terminal fixed voltage I.C regulators (78XX and 79XX) - Principle and working of switch mode power supplies ( SMPS).

### **TEXT BOOKS**

1. Electronic Devices and Circuits David A. Bell, Fifth edition, Oxford university press
2. A.P Malvino, "Principles of Electronics", TMH, 7th edition
3. D.Roy Choudary, Linear Integrated Circuits, New Age International Pvt. Ltd.
4. T.F. Bogart, Beasley, "Electronic Devices and circuits", Pearson Education, 6th Edition
5. N.N. Bhargava, D.C Kulshreshtha, and S.C Gupta, "Basic Electronics and Linear Circuits" TMH,
6. T.L. Floyd, "Electronic Devices and circuits", PHI, fifth edition
7. V.K. Mehta, "Principle of Electronics", S CHAND Co. New edition
8. Godse A.P., Bakshi U.A (1st edition), Electronics Devices, Technical Publications Pune.

### **REFERENCE BOOKS**

1. Sedha R.S., A TextBook of Applied Electronics, S. Chand & Company Ltd.
2. Jacob Millman and Christos C. Halkias (2008) Integrated Electronics, Tata Mcgraw-Hill
3. Robert L. Boylestad, Louis Nashelsky (10th edition), Electron Devices and Circuit Theory, Dorling Kindersley (India Pvt. Ltd.)

### **ELECTRONICS LAB – 2 (ELECTRONIC DEVICES & CIRCUITS LAB) (Any six experiments should be done)**

1. V-I Characteristics of Junction Diode.
2. V-I Characteristics of Zener Diode.
3. Regulated Power Supply using Zener Diode.
4. IC Regulated Power Supply
5. BJT input and output Characteristics (CE Configuration) and determination of h- parameters.
6. Characteristics of UJT.
7. Characteristics of JFET
8. LDR characteristics
9. Characteristics of L and  $\Pi$  section filters with fullwave rectifier

### **LAB MANUAL**

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

# **S.V.UNIVERSITY,TIRUPATI**

## **B.Sc- ELECTRONICS-SYLLABUS**

### **SEMESTER: III**

#### **PAPER3 – DIGITAL ELECTRONICS(60hrs)(w. e .f-2016-17)**

##### **UNIT I(12hrs)**

##### **NUMBER SYSTEMS AND CODES**

Decimal, binary, octal, hex numbers, conversion from one to another –Digital codes- BCD, excess 3, gray codes conversion from one to another – Error detection codes-ASCII code.

##### **UNIT II(12hrs)**

##### **BOOLEAN ALGEBRA AND LOGIC GATES**

Boolean algebra, Boolean operations, Basic & Universal logic gates – Boolean Identities – Boolean theorems De Morgan's Theorems – sum of products, products of sums expressions, simplification of logic expressions based on basic Boolean theorems, simplification by Karnaugh Map method(up to 4-variable map) – don't care conditions.

##### **UNIT III(12hrs)**

##### **COMBINATIONAL CIRCUITS&LOGIC FAMILIES**

Arithmetic Building blocks, Half & Full Adders and Half & Full Subtractors, Parallel binary adder – Multiplexers(2:1,4:1,8:1)-De-multiplexers(1:4,1:8)-Encoders(Octal to Binary,Decimal to BCD)- Decoder (Binary to Octal,BCD to Decimal) – Characteristics for Digital ICs -RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).

##### **UNIT IV(12hrs)**

##### **SEQUENTIAL DIGITAL CIRCUITS**

Flip-flops-SR, Clocked SR, JK, D, T,Race around condition, Master-slave Flip flop –Conversion of Flip flops - Shift registers(SISO,SIPO,PISO,PIPO), Counters – Ripple (or) asynchronous counters & synchronous counters,4-bit ripple counter, 3-bit asynchronous UP/DOWN counter

##### **UNIT V(12hrs)**

##### **MEMORY DEVICES**

ROM Organization – Types of ROMS– PLA(Programmable Logic Array) & PAL (Programmable Array logic) :Architecture,combinational logic design using PLAs&PALs  
Realization of functions using PROM.

##### **TEXT BOOKS**

- 1.G.K.Kharate-Digital electronics-Oxford university press
2. R.P. Jain, "Modern digital Electronics",3rd Edition, TMH, 2003.
3. Puri, V.K., Digital Electronics, Tata Mc Graw Hill
4. Marris mano M., Computer System Architecture, 2nd Edition, Prentice Hall, 1998
5. Malvino and Leach,Digital Principles and applications, McGraw Hill, 1996 IV Edition

6.A.Anand kumar,Fundamentals of digital circuits-PHI

**REFERENCE BOOKS**

- 1.Millman J., Micro Electronics, McGraw Hill International Book Company, New Delhi 1990 Edition.
2. Morris Mano M., “Digital Logic and Computer Design” PHI 2005.
3. Godse A.P., Digital Electronics, Technical Publications.

**ELECTRONICS LAB – 3  
(DIGITAL ELECTRONICS LAB)**

**(Any six experiments should be done –At least 2simulations )**

- 1.Verification of I.C logic gates
2. Universality of NAND & NOR gates.
3. Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)
4. Study of RS, D, T and JK Flip-Flops with IC’s
5. Half and Full Adder using Basic gates & NAND Gates.
6. 4-bit binary parallel adder and Subtractor IC 7483 using PSPICE simulation
7. Study of 7490 BCD Counter – MOD Counters using PSPICE simulation.
8. BCD to Seven segment decoder 7447/7448 using PSPICE simulation.

**LAB MANUAL**

1. Zbar, Malvino and Miller ,Basic Electronics, A Text Lab Manual , Tata McGraw Hill.
2. R.Sugaraj Samuel & Horsley Solomon, B.E.S. Practical .

# **S.V.UNIVERSITY,TIRUPATI**

## **B.Sc- ELECTRONICS-SYLLABUS**

### **SEMESTER: IV**

#### **PAPER 4 – ANALOG & DIGITAL I.C APPLICATIONS(60 hrs)(w. e .f-2016-17)**

##### **UNIT I(12hrs)**

###### **OPERATIONAL AMPLIFIERS**

Basic differential amplifier-Op-Amp supply voltages – IC identification – Internal blocks of Op-Amp, Op-Amp parameters-offset voltages and currents-CMRR-Slew rate, Virtual ground, Op-Amp as a voltage amplifier – Inverting amplifier – non-inverting amplifier – Voltage follower. IC 555 timer - pin functions - internal architecture

##### **UNIT II(12hrs)**

###### **OP-AMP CIRCUITS**

Summing amplifier – Differential amplifier – Op-amp frequency response – Comparator – Integrator – Differentiator – Triangular Wave generators – Square Wave generators – Active filter(Basics) - Lowpass filter - High pass filter – Band pass filter.

**IC 555 APPLICATIONS** - Astable, Monostable and Schmitt trigger.

##### **UNIT III(12hrs)**

###### **COMBINATIONAL & SEQUENTIAL CIRCUITS**

Design of code converter: Binary-to-BCD,BCD-to- Binary, Binary-to-Gray, Gray- to- Binary .Design of Asynchronous Modulo-N counters ,IC7490 BCD counter,Divide-by-N counter using IC7490, Excitation tables for J-K & T FFs,Design of synchronous Modulo-N counters,IC74191 4-bit binary UP/DOWN counter, Divide-by-N counter using IC74191, Design of Universal shift register.

##### **UNIT IV(12hrs)**

###### **DATA CONVERTERS**

Key Features, Advantages and applications of Digital to Analog Converters: Weighted resistive network and R-2R ladder type. Key Features, Advantages and Applications Specific selection of Analog to Digital Converters: Staircase, Ramp Type, dual slope, Successive approximation and Flash type.

##### **UNIT V(12hrs)**

###### **DIGITAL SYSTEM INTERFACING AND APPLICATIONS**

Digital system interfacing of LEDs and Multidigit Seven segment LED display Driver. Interface considerations for ADC / DAC with digital systems.ADC0809,DAC0808.

Applications of counters: Digital clock , Auto-parking system ,Applications of shift registers:  
Time delay generator, parallel to serial converter, serial to parallel converter, UART and serial  
Key board encoder.

### **RECOMMENDED BOOKS**

#### **DIGITAL**

- 1.G.K.Kharate-Digital electronics-Oxford university press
2. Floyd Thomas L Digital Fundamentals Pearson Education
3. Raj kamal Digital System Principles and Design Wheeler
4. Morris Mano Digital Circuit Design PHP
5. Malvino Leach Digital Principles and Applications TMH
6. Strangio Digital Electronics TMH
7. Floyd , Jain Digital Fundamentals TMH
- 8 .Anand Kumar A. Switching Theory and Logic design PHI

#### **ANALOG**

1. Microelectronic circuits by Sedra&Smith-6<sup>th</sup> edition-Oxford
2. Electronic Devices and Circuits David A.Bell, Fifth edition, Oxford university press
3. Jacob Millman and Christos C.Halkias, Integrated Electronics, McGraw Hill.
4. D.Roy Choudary, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd.2000.
5. Operational Amplifiers and Linear I.Cs-by David A.Bell 3<sup>rd</sup> edition, Oxford university press
6. Sedha, R.S. A Text Book of Applied Electronics, S. Chand & company Ltd.
7. Ramakant A. Gayakwad, OP-AMP and Linear ICs, 4th Edition, Prentice Hall / Pearson Education, 1994.
8. G.K.Mithal, Basic Electronic Devices and circuits, 2nd Edition, G.K.Publishers Pvt. Ltd.,

### **REFERENCE BOOKS:**

1. Allen Mottershead, Electronic Devices and Circuits-an Introduction - Prentice Hall.
2. Mithal G.K., Electronic Devices and Circuits, Khanna Publishers.
3. Donald L.Schilling, Charles Belove, Discrete and Integrated Electronic Circuits, McGrawHill.
4. Jacob Milliman, Micro Electronics, McGraw Hill.

### **ELECTRONICS LAB – 4**

#### **ANALOG & DIGITAL I.C APPLICATIONS LAB**

**(Six experiments: 3 Analog & 3 Digital-1 Simulation from each should be done )**

1. OPAMP – Inverting and Non-inverting modes, Unity Follower

- 2.OPAMP – Sine Wave Generator
- 3.Binary to Grey and Grey code to binary converter
- 4.Design of 4-bit priority encoder
- 5.OPAMP – Square wave generator using PSPICE simulation
- 6.Schmitt Trigger using IC 555 timer using PSPICE simulation
- 7.Study of presettable binary up/down counter using PSPICE simulation.
8. Design and verification of 4-bit ripple counter. using PSPICE simulation.

#### **LAB MANUAL**

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

MODEL PAPER  
B.Sc ( Three year ) Degree Examinations.  
SEMISTER-II ELECTRONICS  
Paper-II ELECTRONIC DEVICES AND CIRCUITS

Time: 3 Hrs

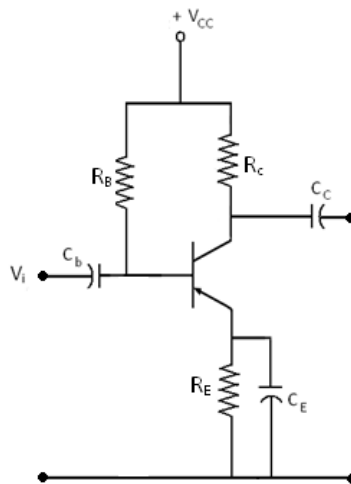
MaxMarks:75

**PART-A**

Answer any FIVE Questions

5x5 = 25 Marks.

1. Explain Zener and Avalanche break down.
2. Explain Junction capacitance of a P-N Junction diode.
3. Define Hybrid parameters of a Transistor.
4. Find the operating point for the bias circuit shown in the fig. provided  $V_{CC} = 9V$  ,  $R_B = 50K\Omega$ ,  $R_C = 250\Omega$ ,  $R_E = 500\Omega$  and  $\alpha = 80$ .



5. What are the advantages of FET over BJT.
6. Write the operation of photo voltaic cell.
7. Draw the circuit diagram of  $\pi$  - section filter and discuss its working.
8. Discuss the working of Transistor series Voltage regulator.

**PART-B**

Answer ALL Questions

10X5 =50marks.

9(a) . Explain forward and reverse bias effects in the V-I Curves of a P-N Junction diode.

( or )



(b) . Describe the construction and working of a Tunnel diode. Draw its V-I Characteristics and explain.

10(a).Draw the input and Output Characteristics of a CE mode of a Transistor . Define Cut-off , Active and saturation region in the characteristics.

(or)

(b).Describe about fixed bias and voltage divider bias of a Transistor . Give their merits and demerits.

11(a).Explain the Construction , working of JFET.

(or)

(b). What is a UJT ? Describe the Volt-Ampere Characteristics of a UJT.

12(a). Explain operation of photoconductive cell and discuss its spectral response.

(or)

(b).Explain Construction and working of LED and write its merits and uses.

13(a).A full wave rectifier uses a centre tapped Transformer . The a.c. Voltage from its centre tap to either end is  $10 \sin 314t$ . The load resistance of the circuit is  $40\Omega$  and Diode resistance  $10\Omega$  . Find  $I_{dc}$ ,  $I_{rms}$ , ripple factor and rectifier efficiency.

(or)

(b).Explain the Principle and working of switch mode power supply ( SMPS) with the help of block diagram.

MODEL PAPER  
B.Sc ( Three year ) Degree Examinations.  
SEMISTER-III ELECTRONICS  
Paper-III DIGITAL ELECTRONICS

Time: 3 Hrs

MaxMarks:75

**PART-A**

Answer any FIVE Questions

5x5 =25Marks.

1. (a) Convert  $(3A.2F)_{16}$  in to decimal.  
(b) Convert  $(1011.111)_2$  to Octal.
2. Give NOR gate implementation for OR,AND and NOT gates?
3. Simplify the Boolean expressions.  
(i)  $Y = A B C + A \bar{B} + A B \bar{C}$   
(ii)  $Y = A C D + \bar{A} B C D$
4. Discuss the working of parallel Binary Adder?
5. Explain the working of a 4 : 1 line multiplexer with the help of logic diagram?
6. Describe the working of D Flip-Flop. How it is obtained from the JK Flip-Flop?
7. Draw the logic diagram for 4-bit SIPO shift register and explain its working?
8. How does the architecture of PLA differ from PAL and PROM?

**PART-B**

Answer ALL Questions

10X5 =50marks.

9. a) Discuss in detail about Binary, Decimal and Hexadecimal number systems. What are the advantages of Decimal and Hex systems over Binary?  
( OR )  
b)What is Gray code. Write Gray code for any 4-bit binary number. Give the advantage of Gray code over binary System.
10. a) Discuss about the postulates and theorems of Boolean Algebra?  
( OR )  
b)Reduce the following expression using K-map and implement in universal logic?  
 $\sum m(0,1,4,5,6,7,9,11,15)+d(10,14)$
11. a)Explain the working of Half adder and Full adder with the help of logic diagrams and truth tables?  
( OR )  
b)Explain the working of TTL NAND gate and CMOS NOR gate?
12. a)Explain the working of Master – Slave JK Flip-Flop .How Race Condition is eliminated in it?  
( OR )  
b)With the help of logic diagram explain the working of 3- bit asynchronous UP/DOWN Counter?
13. a)Draw the Block diagram of PLA and explain about each stage?  
( OR )  
b)A 3-input,4-output combinational circuit has the following output functions.Implement the Circuit  
 $A(x,y,z)=\sum m(1,2,4,6)$   $B(x,y,z)=\sum m(0,1,3,6,7)$   $C(x,y,z)=\sum m(1,2,4,6,7)$   
 $D(x,y,z)=\sum m(1,2,3,5,7)$

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 = 2Marks.

- 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 Integrater circuit and explain how it works?
- 5.With the help of logic diagram explain about Binary-to-Gray 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 the pin diagram of IC555 timer and explain function of each pin?

- 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 Binary-to-BCD 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?

## **B.Sc- ELECTRONICS PRACTICALS**

### **SCHEME OF VALUATION FOR ALL SEMESTERS**

|   |                |
|---|----------------|
| 1.Principle/Statement -----                     | 2marks         |
| 2.Circuit diagram with component labelling----- | 5marks         |
| 3.Tabularform/Formula/Modelgraph-----           | 6marks(3+2+1)  |
| 4.Observations-----                             | 12marks        |
| 5.Calculations/Graph/Result-----                | 10marks(5+3+2) |
| 6.Viva-----                                     | 5marks         |
| 7.Record-----                                   | 10marks        |
| TOTAL= 50marks                                  |                |