

**SRI VENKATESWARA UNIVERSITY :: TIRUPATI**

**FIRST YEAR B.Sc. ELECTRONICS**

**FIRST SEMESTER**

**Revised Syllabus Under CBCS W.E.F. 2020-21**

**PAPER – I CIRCUIT THEORY AND ELECTRONIC DEVICES**

**Objectives:**

- *To explain the basic concepts and laws of DC and AC electrical networks and solve them using mesh and nodal analysis techniques.*
- *To analyze circuits in time and frequency.*
- *To synthesize the networks using passive elements.*
- *To understand the construction, working and VI characteristics of electronic devices.*
- *To understand the concept of power supply.*

**UNIT- 1: (10hrs)**

**SINUSOIDAL ALTERNATING WAVEFORMS:**

*Definition of current and voltage. Differences between AC and DC, general format of sine wave for voltage or current, average value, effective (R.M.S) values. Phasor representation of sine wave, j operator, impedance and admittance, phase relations for R, L, C, R-L, R-C and R-L-C circuits.*

**UNIT-II: (12hrs)**

**PASSIVE NETWORKS AND NETWORKS THEOREMS (D.C):**

*Loop and Branch current methods, Nodal Analysis, star to delta & delta to star conversions. Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power, Milliman and Reciprocity theorems.*

**UNIT-III: (10hrs)**

**RC, RL AND RLC CIRCUITS:**

*Frequency response of RC and RL circuits, their action as low pass and high pass filters. Passive differentiating and integrating circuits. Series resonance and parallel resonance circuits, Q – Factor.*

#### **UNIT-IV: (16hrs)**

##### **BJT, FET and UJT:**

*BJT: Construction, working, and characteristics of CE Configurations. Hybrid parameters and hybrid equivalent circuit of CE Transistor,*

*FET: Construction, working and characteristics of JFET and MOSFET. Advantages of FET over BJT.*

*UJT: Construction, working and characteristics of UJT.*

*UJT as a Relaxation oscillator.*

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

##### **POWER SUPPLIES & PHOTO ELECTRIC DEVICES**

*Rectifiers: Half wave, full wave rectifiers-Efficiency-ripple factor-Filters- L-section& $\pi$ -section filters. Three terminal fixed voltage I.C. regulators(78XX and &79XX). Light Emitting Diode – Photo diode and LDR.*

##### **TEXT BOOKS:**

1. *Introductory circuit Analysis (UBS Publications) ---- **Robert L. Boylestad.***
2. *Electronic Devices and Circuit Theory --- **Robert L. Boylestad & Louisashelsky.***
3. *Circuit Analysis by **P.Gnanasivam- Pearson Education***
4. *Electronic Devices and Circuits I – **T.L.Floyd- PHI Fifth Edition***

##### **REFERENCE BOOKS:**

1. *Engineering Circuit Analysis **By: Hayt & Kemmerly - MG.***
2. *Networks and Systems – **D.Roy Chowdary.***
3. *Unified Electronics (Circuit Analysis and Electronic Devices) **by Agarwal- Arora***
4. *Electric Circuit Analysis- **S.R. Paranjothi- New Age***

*International.*

5. *Integrated Electronics – **Millmam & Halkias.***

6. *Electronic Devices & Circuits – **Bogart.***

7. *Sedha R.S., A Text Book Of Applied Electronics, S.Chand & Company Ltd*

Outcomes:-

- ✓ *Apply concepts of electric network topology, nodes, branches, loops to solve circuit problems including the use of computer simulation.*
- ✓ *Apply time and frequency concepts of analysis.*
- ✓ *Synthesize the network using passive elements.*
- ✓ *Design and construction of a power supply.*

**ELECTRONICS**

**LAB-I**

**(Circuit Theory and Electronic Devices)**

**LAB LIST:**

1. *Thevenin's Theorem-verification*
2. *Norton's Theorem-verification*
3. *Maximum Power Transfer Theorem-verification*
4. *LCR series resonance circuit.*
5. *BJT input and output characteristics*
6. *FET Output and transfer characteristics*
7. *UJT VI characteristics*
8. *LDR characteristics*
9. *IC regulated power supply(IC-7805)*

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

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**SRI VENKATESWARA UNIVERSITY: TIRUPATI**

THREE YEAR B.Sc DEGREE (CBCS) EXAMINATIONS

FIRST SEMESTER-Model paper

Part-II Electronics

**Circuit theory and Electronic devices**

Time : 3 Hours

Max. Marks : 75

Part-A

Answer any FIVE questions

Each question carries 5 Marks

(Marks 5X5 = 25 Marks)

1. The Impedance of a series R-L circuit is found to be  $500\Omega$  at  $800\text{Hz}$  and  $800\Omega$  at  $1.6\text{ KHz}$ . Find R and L
2. State and prove Norton's theorem?
3. Explain loop current method?
4. Explain how an RC circuit works as High pass filter?
5. Compare the series and parallel resonance circuits?
6. Define hybrid parameters and give h-parameter equivalent circuit for CE configuration?
7. Write the differences between FET and BJT?
8. Explain the working principle of LED?

PART-B

Answer all questions.

(Marks 5X10 = 50 Marks)

9. (a) What are average value and effective value of AC? Obtain these values for a sinusoidal Voltage?  
(or)  
(b) Describe phasor representation of sinusoidal current and voltages. What are the significance of 'j' operator?
10. (a) State and prove maximum power transfer theorem.  
(or)  
(b) Explain node voltage method of solving networks using kirchoff's laws.
11. (a) Explain the transient response of RC circuit. Calculate the time constant of a RC circuit in which a capacitor  $C= 10\mu\text{f}$  and a resistance  $R= 1\text{m}\Omega$  are connected in series across a 50V DC source.  
(or)  
(b) Explain the term resonance. Obtain expression for the resonant frequency and Q factor of a parallel LCR circuit.
12. (a) Discuss the construction and working of UJT and draw the characteristics of a UJT. Find the Intrinsic stand-off ratio of a UJT, whose peak voltage is 8V when a 12V potential difference is applied between its two bases.  
(or)  
(b) Explain the construction and working of JFET, Draw its Drain and transfer characteristics?
13. (a) Draw the circuit diagram of full wave rectifier and explain its action. Derive an expression for its ripple factor.  
(or)  
(b) Explain the construction and working of LDR, with a neat diagram. Mention application of LDR.