C21_ Curriculum

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

OFFERED BY

STATE BOARD OF TECHNICAL EDUCATION & TRAINING,

TELANGANA: HYDERABAD

III SEMESTER

Sl No	Course Code	Course Name	Teaching Scheme				Credits	Examination Scheme						
			Instruction periods per week			Total Periods per semester		Continuous internal evaluation			Semester end examination			
			L	T	P			Mid Sem 1	Mid Sem 2	Internal evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
1	SC-301	Applied Engineering Mathematics	4	1	0	75	3	20	20	20	40	14	100	35
2	EC-302	Digital Electronics	4	1	0	75	3	20	20	20	40	14	100	35
3	EC-303	Electronic Devices and Circuits	4	1	0	75	3	20	20	20	40	14	100	35
4	EC-304	Communication Systems	4	1	0	75	3	20	20	20	40	14	100	35
5	EC-305	Network Analysis	4	1	0	75	3	20	20	20	40	14	100	35
6	EC-306	Electronic Devices Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
7	EC-307	Network Analysis Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	EC-308	Digital Electronics Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	EC-309	Circuit Design & Simulation Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	HU-310	Communication and Life Skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11	EC-311	Skill Upgradation	0	0	8	120	2.5	0	0	Rubrics			--	-
	Activities: student performance is to be assessed through Rubrics													

SC-301 - APPLIED ENGINEERING MATHEMATICS

Course Title	Applied Engineering Mathematics	Course Code	SC-301
SEMESTER	III	Course Group	Foundation
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the knowledge of Basic Engineering Mathematics and Engineering Mathematics at Diploma 1st and 2nd Semester level.

Course Outcomes: COs

At the end of the course, the student will have the ability to:

CO 1	Integrate different kinds of continuous functions
CO 2	Integrate various continuous functions using different methods of integration
CO 3	Find the values of definite integrals using fundamental theorem of integral calculus.
CO 4	Apply definite integrals to determine Areas, Volumes of irregular shapes.
CO 5	Find the Mean and RMS values of various functions and Approximate values of Definite integrals using Trapezoidal and Simpson's 1/3rd rule
CO 6	Find order and degree of a Differential equation, form the Differential Equation from given primitive by eliminating the arbitrary constants and Solve Simple DEs of 1st order and 1st degree.

Course Content:

Unit-I

Duration: 14 Periods (L: 11 – T:3)

Indefinite Integration-I

Integration regarded as anti-derivative – Indefinite integral of standard functions. Properties of indefinite integral. Integration by substitution or change of variable. Integrals of the form $\sin^m \theta . \cos^n \theta$. Where m and n are positive integers. Integrals of tan x, cot x, sec x, cosec x and powers of tan x, sec x by substitution. Evaluation of integrals which are reducible to the following forms: (Nine standard integrals)

$$i)\ \frac{1}{a^2+x^2}, \frac{1}{a^2-x^2}, \frac{1}{x^2-a^2}$$

$$ii)\ \frac{1}{\sqrt{a^2+x^2}}, \frac{1}{\sqrt{a^2-x^2}}, \frac{1}{\sqrt{x^2-a^2}}$$

$$iii)\ \sqrt{x^2+a^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$$

Unit – II

Duration: 10 Periods (L: 8 – T:2)

Indefinite Integration-II

Integration by decomposition of the integrand into simple rational algebraic functions. Integration by parts - Bernoulli's rule.

Unit-III

Duration: 10 Periods (L: 8 – T: 2)

Definite Integral and its Properties:

Definite integral fundamental theorem of integral calculus properties of definite integrals, evaluation of simple definite integrals. Definite integral as the limit of a sum.

Unit – IV

Duration: 12 Periods (L: 10 – T: 2)

Applications of Definite Integrals:

Areas under plane curves – Sign of the Area – Area enclosed between two curves. Solid of revolution – Volumes of solids of revolution.

Unit – V

Duration: 10 Periods (L: 8 – T: 2)

Mean , RMS values and Numerical Integration:

Mean values and Root Mean Square values of a function on a given interval. Trapezoidal rule, Simpson's 1/3 rule to evaluate an approximate value of a definite integral.

Unit – VI

Duration: 19 Periods (L: 15 – T: 4)

Differential Equations of First Order:

Definition of a differential equation – order and degree of a differential equation – formation of differential equations – solution of differential equation of first order, first degree : Variables -separable, Homogeneous, Exact, Linear differential equation, Bernoulli's equation.

Reference Books:

1. Integral Calculus Vol. I, by M. Pillai and Shanti Narayan
2. Thomas' Calculus, Pearson Addison –Wesley Publishers
3. Higher Engineering. Mathematics, by B.S. Grewal— Khanna publishers—New Delhi

Suggested E-Learning references

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html
2. E-books: www.mathebook.net

Suggested Learning Outcomes

At the end of the course, the student will have the ability to:

Unit-I

1.0 Use Indefinite Integration to solve engineering problems

1.1 Use the concept of Indefinite integral as an anti-derivative.

1.2 Use the indefinite integrals of standard functions and properties of Integrals $\int (u + v)\,dx$ And $\int k\,u\,dx$ where k is constant and *u*, *v* are functions of *x* in solving simple problems.

1.3 Solve integration problems involving standard functions using the above rules.

1.4 Evaluate integrals involving simple functions of the following type by the method of Substitution.

(i) $\int f(ax + b)\,dx$ *where* $f(x)\,dx$ is in standard form.

(ii) $\int [f(x)]^n f'(x)\,dx$

(iii) $\int f'(x)/[f(x)]\,dx$

(iv) $\int f\{g(x)\}\,g'(x)\,dx$

1.5 Find the Integrals of *tan x, cot x, sec x* and *cosec x using* the above.

1.6 Evaluate the integrals of the form $\int Sin^m\,\theta\,Cos^n\theta.\,d\theta$ where m and n are positive integers.

1.7 Evaluate integrals of powers of *tan x* and *sec x.*

1.8 Evaluate the Standard Integrals of the functions of the type : (Nine standard integrals)

$$i)\ \frac{1}{a^2+x^2}, \frac{1}{a^2-x^2}, \frac{1}{x^2-a^2}$$

$$ii)\ \frac{1}{\sqrt{a^2+x^2}}, \frac{1}{\sqrt{a^2-x^2}}, \frac{1}{\sqrt{x^2-a^2}}$$

$$iii)\ \sqrt{x^2+a^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$$

1.9 Evaluate the integrals of the type :

$$\int \frac{1}{a \pm bSin\theta} d\theta, \int \frac{1}{a \pm b\cos\theta} d\theta \text{ and } \int \frac{1}{a\cos\theta \pm b\sin\theta \pm c} d\theta$$.

Unit-II

2.0 Use Indefinite Integration to solve engineering problems

2.1 Evaluate integrals using decomposition method.

2.2 Evaluate integrals using integration by parts with examples.

2.3 Apply the Bernoulli's rule for evaluating the integrals of the form $\int u.v\,dx$.

2.4 Evaluate the integrals of the form $\int e^x [f(x) + f'(x)]\,dx$.

Unit-III

3.0 Understand definite integral and use it in engineering applications

3.1 Use the fundamental theorem of integral calculus in solving problems

3.2 Calculate the definite integral over an interval.

3.3 Apply various properties of definite integrals in engineering problems.

3.4 Evaluate simple problems on definite integrals using the above properties.

3.5 Find definite integral as a limit of sum by considering an area.

Unit –IV

4.0 Understand definite integral and use it in Engineering applications

4.1 Find the Areas under plane curves and area enclosed between two curves using Integration.

4.2 Obtain the Volumes of solids of revolution and solve problems.

Unit –V

5.0 Understand Mean, RMS values and Numerical Methods

5.1 Obtain the Mean value and Root Mean Square (RMS) value of the functions in any given Interval.

5.2 Apply the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals and solve some problems.

Unit –VI

6.0 Solve Differential Equations in engineering problems.

6.1 Identify a Differential equation and find its order and degree

6.2 Form a differential equation by eliminating arbitrary constants.

6.3 Solve the first order first degree differential equations by the following methods:

(i) Variables Separable.

(ii) Homogeneous Equations.

(iii) Exact Differential Equations

(iv) Linear Differential equation of the form $\frac{dy}{dx}$+ Py = Q,
Where P and Q are functions of x or constants.

(v) Bernoulli's Equation (Reducible to linear form.)

6.4 Solve simple problems leading to engineering applications by using above methods.

Suggested Student Activities

1. Student visits Library to refer Standard Books on Mathematics and collect related material
2. Quiz
3. Group discussion

4. Surprise tests
5. Seminars
6. Home Assignments
7. Mathematics for preparing competitive exams and solving old question papers on arithmetical ability.

CO / PO - MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapped POs
CO1	3	2					3	1, 2 ,7
CO2	3	2					3	1, 2 ,7
CO3	3	2					3	1, 2 ,7
CO4	3	2					3	1, 2 ,7
CO5	3	2					3	1, 2 ,7
CO6	3	2					3	1, 2 ,7

	MID SEM-I EXAM						
S.No	Unit Name	R	U	A	Remarks		
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)			
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)			
Total Questions		4	4	4			
MID SEM –II EXAM							
S.No	Unit Name	R	U	A	Remarks		
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)			
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)			
Total Questions		4	4	4			

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R		U		A	
1	I	4	1	9(a)		13(a)	
2	II						
3	III		2	10(a)		14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
					12(a)	16(a)	
					12(b)	16(b)	
Total Questions		8		8		8	

Legend:	Remembering (R)	1 Mark				
	Understanding (U)	3 Marks				
	Application (A)	5 Marks				

BOARD DIPLOMA EXAMINATIONS (C21)

MID SEM –I, III SEMESTER

SC-301- APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2 Each question carries **ONE** mark

1. Integrate (e^x – Sin x + x^4) with respect to x
2. Find $\int \frac{dx}{5x+7}$ dx
3. Write Bernoulli's rule of integration
4. Find $\int$ x logx dx

PART-B

Instructions: 1. Answer **ALL** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a) Evaluate $\int \frac{x^5}{1+x^{12}} dx$.

OR

5 b) Evaluate $\int \frac{dx}{(x^{2+}16)}$

6 a) Evaluate $\int x\, sinx dx$

OR

6 b) Evaluate $\int \frac{3x+2}{(x-1)(2x+3)} dx$.

PART- C

Instructions: 1. Answer **ALL** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Evaluate $\int \sqrt{x^2 + 2x + 5}$ dx

OR

7 b) Evaluate: $\int cosx\, cos2x dx$.

8 a) Find $\int xtan^{-1}x dx$.

OR

8 b) Find $\int x^4 Cos2x dx$.

BOARD DIPLOMA EXAMINATIONS (C21)
MID SEM –II, III SEMESTER
SC-301-APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04
2 Each question carries **ONE** mark

1. Find $\int_0^1 (x^4 + 1)\, dx$
2. Evaluate : $\int_0^{\pi} Sin3x dx$
3. Evaluate : $\int_0^1 \frac{1}{1+x^2} dx$
4. Write the formula to find area bounded by the curve y= f(x) , x-axis, between the limits x=a and x =b

PART-B

Instructions: 1. Answer **ALL** questions 02 X 03 = 06
2. Each question carries **THREE** marks

5 a) Evaluate: $\int_0^{\frac{\pi}{2}} \sqrt{1 - Sin2x} dx$

OR

5 b) Evaluate: $\int_0^{\frac{\pi}{2}} sin^2 x dx$

6 a) Find the area bounded by the line 2x + y =8, x-axis and the lines x = 2 and x = 4.

OR

6 b) Find the Volume of the Solid generated by revolving the part of the Circle $x^2 + y^2 = 36$ From x = 0 to x = 4 about x – axis.

PART C

Instructions: 1. Answer **ALL** questions 02 X 05 = 10
2. Each question carries **FIVE** marks

7 a) Evaluate: $\int_0^{\frac{\pi}{2}} \frac{\sqrt{Sinx}}{\sqrt{Sinx}+\sqrt{Cosx}} dx$

Or

7 b) Evaluate: $\int_0^{\frac{\pi}{2}} \log cos\, x dx$

8 a) Find the area enclosed between the Parabolas $y = 3x - x^2$ *and* $y = x^2 - x$.

Or

8 b) Find the Volume of the Solid generated by the revolution of the area bounded by the Ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, about x- axis.

BOARD DIPLOMA EXAMINATION (C-21)
III SEMESTER END EXAMINATION
SC-301-APPLIED ENGINEERING MATHEMATICS

Time: 2 hours **[Total Marks: 40]**

PART-A

Instructions: 1. Answer **ALL** questions 08 X 01 = 08
2 Each question carries **ONE** mark

1. Find $\int (x^8 - \frac{5}{x})\, dx$
2. Evaluate $\int_0^1 (x^2 + 1)\, dx$
3. Write the formula to find mean value of y = f(x), in the interval (a, b)
4. Find the Order and Degree of the Differential Equation $x\frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$.
5. Write Trapezoidal Rule to find the approximate value of $\int_a^b f(x)dx$.
6. Write the formula to find RMS value of y = f(x) over the range x=a and x = b.
7. Solve $\frac{dy}{dx} = e^{4x+y}$
8. Write the condition for exactness of the differential equation M(x, y)dx + N(x,y)dy =0

PART-B

Instructions: 1. Answer **ALL** questions 04 X 03 = 12
2. Each question carries **THREE** marks

9.

a) Evaluate: $\int_0^{\frac{\pi}{2}} \sqrt{1 - Sin2x}dx$

OR

b) Find the approximate value of $\int_0^6 \frac{dx}{1+x}$ by taking n = 6 using Trapezoidal rule.

10.

a) Find the area bounded by the Parabola $y = x^2 - 2x + 1$ and x-axis.

OR

b) Form the Differential Equation from $y = Ae^x + Be^{3x}$ where A, B are arbitrary constants

11.

a) Find the RMS value of $\sqrt{\log x}$ over the range x= 1 and x= e

OR

b) Calculate approximate value of $\int_0^4 \frac{dx}{1+x}$ by taking n = 4 using Simpson's 1/3 rule

12.

a) Solve: $x\frac{dy}{dx} + 2y = logx$.

OR

b) Solve: $x(1 - y^2)dx + y(1 - x^2)dy = 0$

PART C

Instructions: 1. Answer **ALL** questions 04 X 05 = 20
2. Each question carries **FIVE** marks

13.

a) Evaluate: $\int \frac{1}{x^2 + 8x + 25}\, dx$

OR

b) Find the RMS value of y = $\sqrt{8 - 4x^2}$ between x = 0 and x = 2

14.

a) Find the volume of solid generated by revolving the Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about Major axis

OR

b) Solve: $\frac{dy}{dx} = Sin(x + y)$

15.

a) A curve is drawn to passing through the points given by the following table:

x	1	1.5	2	2.5	3	3.5	4
y	3	3.4	3.7	3.8	2.7	2.6	2.1

Calculate the approximate area bounded by the curve, x-axis and the lines x= 1 and x= 4 using Simpson's 1/3 rule

OR

b) Evaluate: $\int_0^1 \sqrt{(1 - x^2)}dx$ approximately by taking n = 4 using Simpson's 1/3 rd Rule.

16.

a) Solve: $(y^2 - xy)dx = x^2 dy$.

OR

b) Solve: $\frac{dy}{dx} + yCosx = y^3$Sin2x.

EC-302-DIGITAL ELECTRONICS

Course Title	Digital Electronics	Course Code	EC-302
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic knowledge of electronics in Basic Physics at Secondary school level.

Course Outcomes

CO1	Convert Codes and Solve Boolean expressions using K-map.
CO2	Compare various digital IC logic families and identify them by their characteristics.
CO3	Develop Combinational logic circuits like Adders, MUX , De-mux, encoder, decoder and comparator circuits
CO4	Identify the need of sequential circuits and know different flip-flops.
CO5	Design Registers and counter circuits
CO6	Compare different types of memories and understand Converters.

After completion of the course, the student should be able to

COURSE CONTENT

UNIT 1 –

Basics of Digital Electronics

Duration: 16 Periods (L: 10– T: 6)

Convert number systems and Solve Boolean expressions using K-map.

Number systems –-Conversion from one number system into another – performing arithmetic operations in binary-Use of weighted and Un-weighted codes- importance of parity Bit-Different postulates in Boolean algebra- Basic logic gates with truth table- universal logic gates - exclusive – OR gate with truth table- De-Morgan's theorems- AND, OR, NOT operations using NAND, NOR gates- De-Morgan's theorems related postulates to simplify Boolean expressions (up to three variables)- standard representations for logical functions (SOP and POS form)- Boolean expressions from the given truth table- Karnaugh map to simplify Boolean Expression (up to 4 variables only)

UNIT2 –Digital IC logic families

Duration: 08 Periods (L: 08– T: 0)

Compare various digital IC logic families and identify them by their characteristics.

Classification of digital logic families- Important characteristics of Digital ICs- requirements of TTL and CMOS ICs - Propagation delay and Noise margin- Fan-in and Fan-out capacity- Power dissipation- Figure of merit of a logic family- explain TTL NAND gate with open collector- TTL NAND gate with Totem pole output- CMOS NAND gate circuit – Compare logic families- IC numbers of two input Digital IC Logic gates.

UNIT 3–Develop Combinational logic circuits like Adders ,MUX, De-mux, encoder, decoder and comparator circuits.

Duration: 14 Periods (L: 10– T: 4)

Concept of combinational logic circuits- Half adder circuit -truth table- Half-adder using NAND gates only &NOR gates only- Full adder circuit - Truth table- Full-adder using two Half-adders and an OR – gate - a 4 Bit parallel adder using full – adders- 2's compliment parallel adder/ subtractor circuit- Serial adder -Performance of serial and parallel adder- Operation of 4 X 1 Multiplexers- Operation of 1 to 4 demultiplexer- IC numbers - applications- 3 X 8 decoder- BCD to decimal decoder- Decoders- Decimal to BCD encoder- IC numbers -Applications - Tri-state buffer - Types of tri-state buffers-Applications - Digital comparator.

UNIT 4–Identify the need of sequential circuits and know different flip-flops.

Duration: 10 Periods (L: 8– T: 2)

Concept of Sequential logic circuits- NAND and NOR latches with truth tables-Necessity of clock - Clocked SR flip flop circuit using NAND gates- Need for preset and clear inputs - Circuit of Clocked JK flip flop (using S-R flip-flops) with truth table -Race around condition- Master slave JK flip flop circuit - clocked D and T flip flops - Truth table, Circuit diagram and timing diagram- Symbols of above Flip Flops- Truth tables - Applications for each type of flip flop

UNIT 5–Design Registers and counter circuits using flip-flops.

Duration: 14 Periods (L: 10– T: 4)

- Need for a Register - Types of registers- 4 bit shift left and shift right registers - 4-bit bi-directional shift Register - Parallel in parallel out shift register - Universal shift register (74194) - Applications of shift registers. 4-bit asynchronous counter - Asynchronous decade counter with a circuit - 4-bit synchronous counter–Differences between synchronous and asynchronous counters- asynchronous 3 bit up-down counter -Ring counter- applications

UNIT 6– Compare different types of memories and understand Converters.

Duration: 13 Periods (L: 10– T: 3)

Types of memories - Memory read operation, write operation, access time, memory capacity, address lines and word length- ROM and RAM- Diode ROM- - static RAM and dynamic RAM- Flash ROM.

Operational amplifiers- Instrumentation amplifiers- A/D binary weighted resistors- R-2R ladder circuits - D/A converters- counter method and successive approximation method.

Specific Learning Outcomes: upon completing this course the student will be able to

1.0 Understand the basics of Digital Electronics

1.1 Retrieving inter system conversions of Binary, Octal and Hexadecimal number systems.
1.2 Memorizing binary addition, subtraction, Multiplication and Division.
1.3 Perform subtraction of binary numbers in 2's complement method.
1.4 State the use of weighted and Un-weighted codes and list the types.
1.5 Work out 8421, Excess-3 codes.
1.6 Convert a given binary number into Gray code and vice-versa.
1.7 Explain the use of alphanumeric codes (ASCII & EBCDIC)
1.8 State the importance of parity Bit.
1.9 State different postulates in Boolean algebra.
1.10 State and Prove De-Morgan's theorems.
1.11 Interpret the basic logic gates.
1.12 Explain the working of universal logic gates (NAND, NOR gates).
1.13 Explain the working of special purpose (exclusive – OR and exclusive NOR) gates.
1.14 Realize basic gates using NAND, NOR gates.

1.15 Realize Special Purpose gates using NAND / NOR gates.

1.16 Apply De-Morgan's theorems related postulates to simplify Boolean expressions (up to four variables).

1.17 Infer standard representations for logical functions (SOP and POS form)

1.18 Find Boolean expressions from the given truth table and draw the logic circuit.

1.19 Use Karnaugh map to simplify Boolean Expression (up to 4 variables only) in SOP form.

1.20 Use Karnaugh map to simplify Boolean Expression (up to 4 variables only) in POS form.

2.0 Understand different logic families.

2.1 Classify digital logic families (like TTL, CMOS and ECL).

2.2 Outline the important characteristics of Digital ICs

2.3 Explain logic levels and Voltage requirements of TTL and CMOS ICs.

2.4 Define propagation delay , Noise margin, Power dissipation and figure of merit of a Logic family

2.5 Define Fan-in and Fan-out capacity of a digital IC.

2.6 Explain the working of open collector TTL NAND gate with a circuit diagram.

2.7 Explain the working of Totem pole output TTL NAND gate with a circuit diagram.

2.8 Explain the working of CMOS NAND gate with a circuit diagram.

2.9 Compare and contrast TTL, CMOS and ECL logic families.

2.10 Give IC numbers of Digital IC Logic gates (One for each type).

3.0 Understand the working of combinational logic circuits.

3.1 Explain about combinational logic circuit.

3.2 Discuss half adder and full adder with logic diagram, function table and output expressions.

3.3 Implement half adder circuit using basic gates and Universal gates.

3.4 Realize full-adder using two Half-adders and an OR – gate.

3.5 Explain the working of 4 Bit parallel adder circuit using full adders.

3.6 Explain 2's compliment parallel adder/ subtractor circuit.

3.7 Explain the working of a serial adder circuit.

3.8 Compare the performance of serial and parallel adder.

3.9 Discuss the operation of multiplexer and Decoder/De-multiplexer.

3.10 Explain the operation of 4 X 1 Multiplexer with necessary diagrams.

3.11 Explain the operation of 1 to 4 De Multiplexer with necessary diagrams.

3.12 Describe the operation of decoder/ encoder.

3.13 Explain the operation of 3 x 8 decoder with relevant diagrams.

3.14 Explain the working of BCD to decimal decoder circuit.

3.15 Explain the working of Decimal to BCD encoder circuit.

3.16 State the need for a tri-state buffer and give the two types of tri-state buffers.

3.17 Explain the operation of 2 bit digital comparator and draw its circuit.

3.18 Give the IC numbers of Multiplexers, decoders in TTL/CMOS logic families

3.19 Mention the applications of Multiplexers, Decoders/De Multiplexers and Encoders .

4.0 Understand the working of Sequential logic circuits: Flip Flops

4.1 Explain about Sequential logic circuit.

4.2 Distinguish between combinational and sequential circuits.

4.3 Explain NAND and NOR latches with logic diagrams.

4.4 State the necessity of clock and explain different clocking methods.

4.5 Explain clocked SR flip flop circuit using NAND gates.

4.6 State the need for preset and clear inputs.

4.7 Explain the circuit of JK flip flop (using S-R flip-flops) with truth table.

4.8 What is race around condition in JK flip-flop?

4.9 Explain the working of master slave JK flip flop circuit with necessary diagrams.

4.10 Explain the level clocked D and T flip flops with the help of truth table, logic diagram and timing diagram.

4.11 List any 2 commonly used IC numbers of flip flops of each type.

4.12 List two applications for each type of flip flop.

5.0 Understand the working of Sequential logic circuits: Registers and Counter

5.1 State the need for a Register and Classify the registers.

5.2 Explain the working of 4 bit shift left and shift right registers with a circuit and timing diagram.

5.3 Explain the working of 4-bit bi-directional shift register with a circuit and timing diagram.

5.4 Explain parallel in parallel out shift register with a circuit and timing diagram.

5.5 List any four common applications of shift registers.

5.6 Define a counter and modulus of a counter.

5.7 Explain the working of asynchronous 3 bit up-down counter with a circuit and Timing diagram.

5.8 Explain the working of 4-bit asynchronous up counter with a circuit and Timing diagram.

5.9 Explain the working of 4-bit synchronous counter with a circuit and Timing diagram.

5.10 Explain the working of decade counter with a circuit and Timing diagram.

5.11 Distinguish between synchronous and asynchronous counters.

5.12 List any 2 commonly used IC numbers of Registers/Counters.

5.13 Explain the working of ring counter.

5.14 List any three applications for counters and ring counter.

6.0 Understand about memories and A/D and D/A converters.

6.1. Discuss the need of memory .

6.2. Define the terms memory read operation, write operation, access time, memory capacity and word length

6.3. Classify various types of memories.

6.4. Explain the working of diode ROM.

6.5. Compare static RAM and dynamic RAM.

6.6. Compare RAM and dynamic ROM.

6.7. State the need for Flash ROM.

6.8. Explain the use of op amp and Instrumentation amplifiers.

6.9. Explain the OP amp instrumentation amplifier circuit.

6.10. Distinguish between Op amp and instrumentation amplifier.

6.11. State the need of A/D and D/A conversion.

6.12. Define the terms resolution, Accuracy, Monotonicity and settling time of D/A converter.

6.13. Draw and explain the circuit of D/A converter using binary weighted resistors.

6.14. Draw and explain the circuit of D/A converter using R-2R ladder network.

6.15. Explain the operation of A/D converter using counter method with a block diagram.

6.16. Explain A/D converter using successive approximation method with a block diagram.

6.17. Compare the performance of above A/D converters

RECOMMENDED BOOKS

1. Digital Computer Electronics by Malvino and leach. 3rdedition Tata McGraw-Hill Education
2. Modern Digital Electronics By RP JAIN TMH
3. Digital Electronics: Principles & Applications by Roger L. Tokheim -McGraw-Hill Education, 2008
4. Digital Electronics by GK Kharate, Oxford University Press.

e-links

1. www.nptel.com
2. www.electronics4u.com

Suggested student activities.

1. Learn how to Test the digital IC's and submit a report.
2. Propose how to manage the e-waste.
3. Perform trouble shooting of the not working equipment in the lab.
4. Learn the latest CMOS IC equivalents of the TTL IC's.
5. Prepare a simple PCB to perform verification of truth table for basic gates.
6. Prepare a PPT on the day to day application of the gates you have studied.

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1 :	Convert number systems and Solve Boolean expressions using K-map.	R/U	1,2,10	16
CO2 :	Compare various digital IC logic families and identify them by their characteristics.	R/U	1,2,5,6,7	8
CO3 :	Design adders using Combinational logic.	R/U/A	1,2,9	14
CO4 :	Develop Combinational logic circuits like MUX , De-mux, encoder, decoder and comparator circuits.	R/U/A	1,2,5,7	10
CO5 :	Identify the need of sequential circuits and design registers using flip-flops.	R/U/A	1,2,5	14
CO6 :	Compare different types of memories and understand Converters.	R/U/A	1,2,3,7	13

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R(1 Mark)			U(3 Marks)	A(5 Marks)	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
					12(a)	16(a)	
					12(b)	16(b)	
Total Questions		8			8	8	

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER MID- SEM I

IME : 1 HOUR MAX. MARKS : 20

PART-A

Answer ALL questions. 4 x 1= 4M

1. Convert the binary number 1101101 into its decimal equivalent.

2. Draw the logic symbol of AND and OR gates.

3. Define propagation delay with reference to digital IC.

4. Write CMOS IC nos. of AND and NAND gates.

PART – B

Answer ALL questions. 2 x 3 = 6 M

5 (a) Perform 2's complement of subtraction for the binary numbers 10110 – 110110

OR

5(b) Draw the symbol of NAND gate, write its truth table and output expression.

6(a) Define Fan-in and Fan-out capacity of a digital IC.

OR

6(b) Write the specifications of digital IC's.

PART – C

Answer ALL questions. 2 x 5 = 10 M

7(a) Explain the working of universal logic gates NAND and NOR with truth tables.

OR

7(b) Simplify the Boolean expression using De-Morgan's theorems and draw its simplified logic circuit.

$\underline{AB}CD + B\underline{A}CD + \underline{CBA}D$ + ABCD + $B\underline{C}AD$

8(a) Draw the TTL totem pole circuit and explain.

OR

8(b) Compare the various logic families.

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER MID- SEM II

TIME : 1 HOUR MAX. MARKS : 20

PART-A

Answer ALL questions. 4 x 1= 4M

1. Define combinational logic circuit.
2. Draw the circuit of full adder using half adders.
3. Define a multiplexer.
4. Write any 2 IC nos. of multiplexers.

PART – B

Answer ALL questions. 2 x 3 = 6 M

5 (a) Explain the operation of full adder with a truth table.

OR

5(b) Compare the performance of serial adder and parallel adder.

6(a) Write the truth table of 1 x 4 de-multiplexer.

OR

6(b) Write any 3 applications for each of MUX and decoders.

PART – C

Answer ALL questions. 2 x 5 = 10 M

7(a) Explain the working of 4-bit parallel adder using half adders.

OR

7(b) Explain 2's compliment parallel adder/subtractor circuit.

8(a) Write the truth table of 1 x 8 demultiplexer and draw its circuit.

OR

8(b) Explain the working of BCD to decimal decoder circuit.

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER - SEMESTER END EXAMINATION

TIME: 2 HOURS MAX. MARKS : 40

PART-A

Answer ALL questions. 8 x 1= 8M

1. State any 2 postulates of Boolean algebra.
2. Define a de-multiplexer.
3. What is edge-triggering with reference to clock.
4. Draw the symbol of D and T flip-flop
5. List any 2 IC numbers of JK flip-flop.
6. Define modulus of a counter.
7. Define memory access time.
8. Define accuracy and resolution of converters.

PART – B

Answer ALL questions. 4 x 3 = 12 M

9 (a) List out the specifications of digital IC's.

OR

9(b) Explain clocked SR flip flop using NAND gates.

10(a) Realize a half adder using NAND gates only.

OR

10(b) Distinguish between synchronous and asynchronous counters.

11(a) Write the logic symbol and negative edge triggered truth table of D flip-flop.

OR

11(b) State the need of a register and list its types.

12(a) Draw the circuit of a decade counter.

OR

12(b) Differentiate between ROM and RAM.

PART – C

Answer ALL questions. 2 x 5 = 10

M

13(a) Simplify the Boolean expression $\sum \quad \pi M(1,3,6,8,14,15)$ using K- map and draw its simplified logic circuit.

OR

13(b) Explain the working of 4-bit left shift register with a circuit and timing diagram.

14(a) Explain the working of 4-bit bit parallel adder using full adders.

OR

14(b) Explain the working of diode ROM.

15(a) Explain the working of parallel-in and parallel-out register with circuit and timing diagram.

OR

15(b) Explain the working of master slave JK flip-flop circuit with necessary diagrams.

16(a) Explain successive approximation method.

OR

16(b) Explain the R-2R ladder network.

EC-303-ELECTRONIC DEVICES AND CIRCUITS

Course Title	Electronic Devices and Circuits	Course Code	EC-303
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours	75
CIE	60 Marks	SEE	40 Marks

Pre requisites :

This course requires the basic knowledge of Physics and Mathematics at Secondary school level ,and about operation of diode and Transistor

Course Outcomes:

Upon completion of the course, the student should be able to

	Course Outcome
CO1	Analyze various types of DC power supplies.
CO2	Interpret the various types of small signal amplifiers.
CO3	Construct multi stage and feedback amplifiers using Transistors
CO4	Construct tuned amplifiers and power amplifiers using Transistors
CO5	Understand the concepts of operational amplifiers
CO6	Design wave shaping circuits using Diodes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	-	1	1	3
CO2	3	3	3	2	3	3	3
CO3	3	2	3	3	2	3	3
CO4	3	1	3	3	1	3	3
CO5	3	1	2	1	2	1	3
CO6	3	1	3	3	3	2	3

Course Contents

Unit -1: DC Power supplies

Duration: 12 periods

Need for DC power supply- Half wave, Full wave and Bridge rectifiers-RMS value, Average value, Ripple factor, Voltage regulation. Filters: C, LC, and CLC. Zener regulator –IC Regulators

Unit 2 –Small signal and Multistage amplifiers

Duration: 12 Periods (L: 8–T:4)

Classify amplifiers- small signal amplifier- Multistage amplifiers – Need for multistage amplifiers-Different parameters- 2-stage RC coupled amplifier- 2-stage Transformer coupled amplifier- 2-stage Direct coupled amplifier- Darlington pair- Cascode amplifier-

Unit-3: Feedback amplifiers and Oscillators

Duration: 13 Periods (L: 8–T:4)

Feedback Amplifiers:- Concept of feedback- four types of negative feedback amplifiers- Effect of negative feedback- Merits and De-merits of Negative Feedback.

Oscillators: Barkhausen criteria in oscillators- Oscillator circuits- Hartley oscillator- Colpitts oscillator- Crystal Oscillator- Expressions for frequency of oscillation and condition for sustained oscillations of the above circuits- Reasons for instability in oscillator circuits- Remedies for instability in oscillators- Advantages of crystal oscillators- Merits and demerits of RC and LC oscillators.

UNIT -4:Tuned and Power amplifiers

Duration: 13 Periods (L:9–T:4)

Tuned amplifier: Tank circuit-single tuned amplifier-Double tuned amplifier-Stragger tuned amplifier **Power Amplifier**:- Difference between Voltage and Power amplifiers- Classification of power amplifiers- Class A single ended- Push-pull amplifier circuit- Effect of distortion in amplifiers- Choice of Class A , Class B Class AB Amplifier and Class C Amplifiers- Applications of Class C Amplifiers - Efficiencies of different types of power amplifiers(A,B, AB &C)

UNIT- 5: Non Linear Wave shaping circuits

Duration: 12 Periods (L: 8–T:4)

Clippers and Clampers: Design of simple clippers- Clamper circuits - Applications of clippers and clampers **Time Base generators:** Sweep or Time Base signal-Errors in sweep-Applications of Voltage and current Time base circuits

UNIT -6:Operational Amplifier

Duration: 13 Periods (L:9–T:4)

Need for differential amplifier- Differential amplifier- Operation -- differential gain and common mode gain- Function of an operational amplifier- Symbol - Inverting and Non inverting inputs of Op Amp- Important characteristics of ideal operational amplifier- Input impedance, Open loop gain, Slew rate, CMRR, Input offset voltage,InputoffsetCurrent-blockdiagramandpinoutdiagramofIC741-

PinconfigurationofIC741-Typical values of Open loop gain, Slew rate, CMRR, Input offset voltage, Input offset Current- Power supply requirements of Operational Amplifier- Concept of virtual ground and Virtual short- Single supply operation of Operational Amplifier- Pin configuration of single supply Op Amps such as CA 3011 ,LM324 - Features of above ICs.

Suggested Learning Outcomes:

After completing this course the student will be able to

1.0 **Analyze the working of DC Power Supplies.**

1.1 Explain the necessity of D.C. power supply in electronic circuits

1.2 Explain the working of Half Wave, Full Wave and Bridge rectifier circuits with wave forms.

1.3 Define the terms RMS value, average value, ripple factor and efficiency and give their expressions for the above circuits.

1.4 Define Voltage Regulation.

1.5 Explain the need for a filter circuit in power supplies.

1.6 Explain the operation of a rectifier circuit using Capacitor filter

1.7 Draw the input/output waveform of Rectifier with C Filter

1.8 Give the reasons for connecting a Bleeder Resistor across capacitor

1.9 Explain the working of LC Filter

1.10 Explain the working of CLC filters Circuit

1.11 List the applications where CLC filters are used

1.12 State the need for a regulated power supply

1.13 List important specifications of Regulated power supply

1.14 Draw the circuit of a simple Zener regulated DC Power supply.

1.15 Explain the working of Zener regulated power supply

1.16 Determine the Resistance value and wattage of Series Resistor for a given Input voltage, load voltage and load current in Zener Regulator circuit.

1.17 Compare positive and negative IC Regulators, Pin configurations and voltage levels.

2.0 Explain the working of Small signal and Multi-stage amplifiers

2.1 Classify amplifiers based on coupling, feedback and frequency

2.2 State the need for multi-stage amplifiers

2.3 Define gain, frequency response and bandwidth of multi-stage amplifier

2.4 Give the expressions for gain, frequency response and bandwidth of multi-stage amplifier

2.5 Solve simple problems on overall gain, overall frequency response and overall bandwidth of multi-stage amplifiers

2.6 Draw2-stage RC coupled amplifier circuit.

2.7 Explain the operation of 2-stage RC coupled amplifier.

2.8 Explain the frequency response of the above circuit.

2.9 Draw2-stage Transformer coupled amplifier circuit.

2.10 Explain the operation of 2-stage Transformer coupled amplifier

2.11 Explain the frequency response of the above circuit.

2.12 Draw 2-stage Direct coupled amplifier circuit.

2.13 Explain the operation of 2-stage Direct coupled amplifier

2.14 Draw Darlington pair circuit.

2.15 Explain the operation of Darlington pair circuit.

2.16 Give the expression for current gain of Darlington pair circuit

2.17 Explain high current gain amplifier using Darlington pair

2.18 Draw and explain Cascode amplifier.

3.0 Explain the working of Feedback amplifiers and Oscillators

3.1 Draw the basic block diagram of a feedback amplifier.

3.2 Derive the expression for gain in a feedback amplifier.

3.3 Compare negative and positive feedback.

3.4 Draw the block diagram of voltage series feedback amplifier.

3.5 Draw the block diagram of voltage shunt feedback amplifier

3.6 Draw the block diagram of current series feedback amplifier

3.7 Draw the block diagram of current shunt feedback amplifier

3.8 State the effect of negative feedback on gain

3.9 State the effect of negative feedback on bandwidth

3.10 State the effect of negative feedback on input impedance

3.11 State the effect of negative feedback on output impedance

3.12 List the advantages of negative feedback amplifiers.

3.13 Solve simple problems on effect of negative feedback on gain, bandwidth, Zi and Zo

3.14 State the condition for an amplifier to work as oscillator.

3.15 Mention the requisites of an oscillator.

3.16 State Barkhausen criteria in oscillators.

3.17 Classify oscillator circuits.

3.18 Draw the Hartley oscillator circuit.

3.19 Explain the working of Hartley oscillator circuit

3.20 Mention the condition for sustained oscillations in Hartley Oscillator

3.21 Give the expression for frequency of oscillations in Hartley Oscillator

3.22 Draw the Colpitts oscillator circuit.

3.23 Explain the working of Colpitts oscillator circuit

3.24 Mention the condition for sustained oscillations in Colpitts Oscillator

3.25 Give the expression for frequency of oscillations in Colpitts Oscillator

3.26 Draw the equivalent circuit of crystal and explain.

3.27 Draw the transistor crystal oscillator circuit.

3.28 Explain the working of transistor crystal oscillator circuit

3.29 List the advantages of crystal oscillator

3.30 State the reasons for instability in oscillator.

3.31 Mention the remedies to avoid instability in oscillators.

3.32 Compare the LC and RC oscillators

4.0 Analyze Tuned and Power amplifiers

4.1 Draw and explain double tuned amplifier circuit

4.2 Draw class C tuned amplifier circuit.

4.3 Explain class C tuned amplifier circuit with waveforms

4.4 List applications of tuned circuits

4.5 State the need for a power amplifier.

4.6 Distinguish between voltage and power amplifiers.

4.7 Classify power amplifier based on conduction.

4.8 Define Conversion efficiency

4.9 Define distortion in power amplifier

4.10 Draw the circuit of class A amplifier with resistor load.

4.11 Explain operation of class A amplifier with resistive load

4.12 Derive the expression for efficiency of the above circuit.

4.13 Draw the circuit of class A amplifier with transformer load.

4.14 Explain the operation of class A amplifier with transformer load.

4.15 Derive the expression for efficiency of the above circuit.

4.16 Draw the circuit of class – B push-pull amplifier.

4.17 Explain the operation of class-B push-pull amplifier

4.18 Derive the expression for efficiency of class-B push-pull amplifier.

4.19 List the advantages & disadvantages of push-pull amplifier.

4.20 Draw the circuit of complementary symmetry push-pull amplifier.

4.21 Explain the operation of complementary symmetry push-pull amplifier

4.22 List the conditions to avoid thermal run away in a power transistor

4.23 State the necessity of heat sink for a power transistor.

4.24 List different types of heat sinks and mounting methods.

5.0 Explain the working of Operational amplifier

5.1 State the need for differential amplifier

5.2 Draw and explain the circuit diagram of differential amplifier

5.3 Give reasons for not implementing differential amplifier with discrete components.

5.4 Define the terms differential gain and common mode gain

5.5 State the function of an operational amplifier.

5.6 Draw the symbol of an operational amplifier.

5.7 Explain inverting and Non inverting inputs of Op Amp

5.8 State the important characteristics of ideal operational amplifier with practical values.

5.9 Define Input impedance, Open loop gain, Slew rate, CMRR, Input offset voltage and current.

5.10 Draw and explain the Pin configuration of IC741

5.11 Give typical values of Open loop gain, Slew rate, CMRR, Input offset voltage and current.

5.12 Explain the power supply requirements of Operational Amplifier

5.13 Explain the concept of virtual ground and Virtual short

5.14 Give the pin configuration of single supply op-amps such as CA 3011,LM324

5.15 List 6 important features of above ICs

5.16 Explain the operation of adjustable voltage regulator(LM317)

5.17 Give the formula for output voltage of adjustable regulators

6.0 Non Linear Wave shaping Circuits and Sweep Generators

6.1 List the different types of clippers.

6.2 Explain the unbiased and biased clippers with waveforms

6.3 Explain the double ended clipper with waveforms

6.4 Explain the principle of clamper circuit with waveforms

6.5 Mention the applications of clippers and clampers

6.6 Design simple clippers and clampers for a given input and output waveform

6.7 Define Sweep Voltage.

6.8 State the fundamental consideration of sweep waveform.

6.9 Distinguish between voltage and current time-base generation

6.10 List errors in sweep signal

6.11 Draw simple voltage time base generator

6.12 Explain the operation of voltage time base generator

6.13 Draw simple current time base generator

6.14 Explain the operation of current time base generator

6.15 Draw the Bootstrap sweep circuit

6.16 Explain the operation of Bootstrap sweep circuit

6.17 Draw the Miller sweep circuit

6.18 Explain the operation of Miller sweep circuit

6.19 List the applications of Voltage and current Time base circuits.

References

RECOMMENDED BOOKS:

1. Electronic Devices and Circuits by JB Gupta
2. Electronic Devices and Circuits by Salivahana and Vallava raj
3. Electronic Devices and Circuit theory and applications by Robert Boylested
4. Principles of Electronics by VK Mehta
5. Electronic devices and applications by B. Somanathan Nair,PHI.
6. Electronic Devices an dCircuits by David A. Bell Prentice hall
7. Operational Amplifiers by Ramakanth Gaykward
8. Linear integrated circuits by Roy Choudary

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATION

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R(1 Mark)		U(3 Marks)	A(5 Marks)	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3	9(b)	13(b)	
			5, 6	11(a)	15(a)	
				11(b)	15(b)	
6	VI		7,8	10(b)	14(b)	
				12(a)	16(a)	
				12(b)	16(b)	
Total Questions		8		8	8	

BOARD DIPLOMA EXAMINATIONS

III SEMESTER, MIDSEM – I

EC-303 ELECTRONIC DEVICES AND CIRCUITS.

Time: 1 Hour **Max. Marks: 20**

PART – A

Instructions: Answer **all** questions. Each question carries **one** mark.

4 X 1 = 4 marks

1. Define RMS and average value.
2. Define voltage regulation.
3. List amplifiers based on coupling only.
4. Define gain and frequency response of an amplifier.

PART – B

Instructions: Answer **the following** questions. Each question carries **three** marks

1 x 3 =6 Marks

5a. Explain the need for a filter in power supply.

(OR)

b. State the need for regulated power supply.

6a. Draw the circuit of 2-stage RC coupled amplifier circuit.

(OR)

bDraw the circuit of 2-stage transformer coupled amplifier circuit.

PART – C

Instructions: Answer **the following** questions. Each question carries **five** marks

2x 5 =10 Marks

7a. Explain the working of zener regulated power supply.

(OR)

b. Explain the working of HWR with waveforms.

8a. Explain the operation of Darlington pair circuit with a neat fig.

(OR)

b. Explain the frequency response of RC coupled amplifier.

BOARD DIPLOMA EXAMINATIONS

III SEMESTER, MIDSEM – II

EC-303 ELECTRONIC DEVICES AND CIRCUITS.

Time: 1 Hour **Max. Marks: 20**

PART – A

Instructions: i. Answer **all** questions. Each question carries **one** mark.

4 X 1 = 4 marks

1. What is positive feedback?
2. List any 2 advantages of negative feedback.
3. List any 2 applications of tuned circuits.
4. Define conversion efficiency.

PART – B

Instructions: Answer **the following** questions. Each question carries **three** marks

3x 3 =6 Marks

5a. Classify oscillator circuits,

(OR)

b. Mention the conditions for sustained oscillations in Hartley oscillator.

6a. Classify power amplifiers based on conduction.

(OR)

b. Draw the circuit of class B push-pull amplifier.

PART – C

Instructions: Answer **the following** questions. Each question carries **five** marks

2 x 5 =10 Marks

7a. Compare positive and negative feedback.

(OR)

b. Draw and explain Colpitts oscillator circuit.

8a. Explain the operation of Class A amplifier with transformer load.

(OR)

b. Explain the operation of complementary symmetry push pull amplifier.

BOARD DIPLOMA EXAMINATIONS

III SEMESTER END EXAMINATION

EC-303 ELECTRONIC DEVICES AND CIRCUITS.

Time: 2 Hours **Max. Marks: 40**

PART-A

Instructions: Answer **all** questions. Each question carries **one** mark.

8 X 1 = 8 marks

1. Define RMS and average value.
2. What is negative feedback?
3. Define sweep voltage.
4. State the function of operational amplifier.
5. State the need for a differential amplifier.
6. What is inverting and non-inverting input of op-amp.
7. List the errors in sweep signal.
8. Draw the circuit of series unbiased clipper.

PART – B

Instructions: Answer **the following** questions. Each question carries **three** marks 4 x 3 =12 Marks

9 a. Draw the input and output waveforms of rectifier with C filter.

(OR)

b. List the ideal characteristics of an ideal OP-amp.

10 a. Compare LC and RC oscillators.

(OR)

b. Draw the equivalent circuit of crystal and explain.

11 a. Draw and Pin configuration of IC741

OR

b. Define input impedance and slew rate.

12a. Explain double – ended clipper circuit with waveforms.

OR

b. List the applications of voltage and current time base generators.

PART – C

Instructions: Answer **the following** questions. Each question carries **five** marks

4 x 5 =20 Marks

13a. Explain the working of FWR with waveforms.

(OR)

b. Draw and explain the PIN diagram of OP-amp.

14 a. Draw the block diagram of voltage shunt feedback amplifier

(OR)

b. Explain the working of bootstrap voltage time base generator.

15 a. State the important characteristics of ideal operational amplifier with practical values.

(OR)

b. Explain the working of variable voltage regulator circuit.

16 a. Explain the operation of Miller sweep circuit.

(OR)

b. Draw and explain the circuit of shunt biased clipper with waveforms.

EC-304-COMMUNICATION SYTEMS

Course Title	Communication Systems	Course Code	EC-304
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours :	75
CIE	60 Marks	SEE	40 Marks

Rationale: Communication Systems is another core subject which forms the basis for modern Communication Systems such as Wireless and mobile communication systems. Hence, understanding of Analog and Digital Communication Systems is very much essential for an Electronics and Communication Engineering student not only from the industry point of view but also from knowledge perspective as well. This course serves as a foundation for other advanced electronic communication courses.

Pre requisites

This course requires the basic knowledge of physical sciences at Secondary school level and basic electronics.

CO1 :	Interpret the Terminologies of Communication Systems.
CO2 :	Compare AM ,FM and PM Communication Systems.
CO3 :	Analyze the working of AM and FM Radio Transmitters and Receivers.
CO4 :	Apply the knowledge of Pulse Modulation Techniques
CO5 :	Distinguish the various Digital Modulation Techniques
CO6 :	Analyze Engineering Applications of Analog and Digital Communication.

COURSE CONTENT:

UNIT 1:

1.0 Basics of Communication System

Duration: 10 periods (L: 8, T: 2)

Elements of a Communication System - Block diagram- Frequency Spectrum - Frequencies for different applications- Modulation- Need for modulation in communication systems- Amplitude Modulation (AM)- Wave form of an AM wave- Frequency Modulation (FM) - Waveform of FM - Phase Modulation (PM)- Baseband, carrier, and modulated signals - Relationship between channel bandwidth, baseband bandwidth and transmission time- Causes

of distortion in transmission -Measures for distortion less transmission- Time domain and Frequency domain- Types of noise- Internal and external Noise- Signal to Noise Ratio, Noise Figure and Noise Temperature.

UNIT 2:

2.0 Analog Modulation Techniques

Duration: 15 periods (L: 8, T: 2)

Time Domain equation for an AM signal- Modulation index of an AM signal- Frequency spectrum of an AM signal- Effects of over modulation- Bandwidth of an AM signal- Relation between total power and carrier power in AM-Solve simple problems- Need for DSBSC and SSB modulation techniques- Advantages and disadvantages of SSB- Applications of SSB- Vestigial Side Band Modulation-Angle Modulation- Types of angle modulation- Time domain equation for FM signal-Modulation index of an FM signal- Comparison of AM , FM and PM- Narrow band and Wide band FM- Pre-emphasis and De-emphasis- Need for pre-emphasis and de-emphasis in FM.

UNIT 3:

3.0 Transmitters and Receivers.

Duration: 10 periods (L: 8, T: 2)

Requirements and Specifications of Transmitters- Block diagram for high level modulated Transmitter - Low level modulated Transmitter –Comparison between low level and high level modulation- Block diagram of basic SSB Transmitter - Block diagram of indirect FM transmitter (Armstrong method)- Block diagram of TRF Receiver - Limitations of TRF Receiver- Need for super heterodyning in radio receiver- Block Diagram and working of Super heterodyne Receiver- Choice of IF- Sensitivity, Selectivity and Fidelity, Image Frequency and Image Frequency Rejection Ratio- Automatic Gain Control (AGC)- Process of demodulation in AM Receivers- Block diagram of FM receiver - Foster-Seeley Discriminator.

UNIT 4:

4.0 Principles of Pulse Modulation Techniques

Duration: 15 Periods (L: 12,T: 3)

Analog and Digital signals-Compare analog and digital communication techniques-Block diagram of digital communication system-Information capacity of a channel- Sampling Theorem and its significance-Pulse Modulation Techniques- PAM,PWM and PPM waveforms- Generation and Demodulation of PAM, PWM and PPM- Advantages and disadvantages of PAM, PWM and PPM -Compare PAM, PWM and PPM- PCM- Generation and Demodulation PCM signal – Delta Modulation.

UNIT 5

5.0 Digital Modulation Techniques

Duration: 13 Periods (L:12,T:3)

Need for digital modulation - Bit rate and Baud rate -Types of digital modulation techniques- ASK,FSK and PSK- ASK modulator with block diagram- ASK coherent demodulator with block diagram- Advantages and disadvantages of ASK- Binary FSK (BFSK) modulator with block diagram- Coherent BFSK demodulator- FSK demodulator using PLL - Advantages and disadvantages of FSK- BPSK modulator- BPSK demodulator- advantages of BPSK- Importance of Constellation diagram- QPSK with constellation diagrams –Comparison of ASK, FSK and PSK- Quadrature Amplitude Modulation (QAM)- Application areas of different digital modulation techniques- Need for Error Control.

UNIT 6:

6.0 Engineering Applications

Duration :12 periods (L:12,T:3)

Problems based on noise, Signal to Noise Ratio (SNR), Noise Figure, Noise Temperature- Carrier power and total power, bandwidth, modulation index in AM- Bandwidth and modulation index in FM- Classification of Telephone Systems- Internet Telephony- IP Telephony (VOIP)-Need for a Modem in data communication- Types of broadband access technologies- Multiplexing- FDM-TDM- Need for multiple access techniques- Types- Frequency Division Multiple Access (FDMA) with a block diagram- Features of FDMA- Time Division Multiple Access (TDMA) with a block diagram-Features of TDMA- Code Division Multiple Access (CDMA) technique with a block diagram- Features of CDMA- Advantages of CDMA- Compare FDMA, TDMA and CDMA

Specific Learning Outcomes

On completion of the study of this course, students shall be able to comprehend the following:

1.0 Understand basics of Communication Systems.

1.1 Describe the basic elements of a communication system with block diagram.

1.2 Explain frequency spectrum and mention the usage of frequencies for different applications.

1.3 Define Modulation.

1.4 State the need for modulation in communication systems.

1.5 Define Amplitude Modulation (AM).

1.6 Draw the wave form of an AM wave.

1.7 Define Frequency Modulation (FM).

1.8 Draw the waveform of FM Wave.

1.9 Define Phase Modulation.

1.10 Distinguish between baseband, carrier, and modulated signals and give examples.

1.11 Explain the relationship between Channel Bandwidth, Baseband Bandwidth and Transmission Time.

1.12 List causes of distortion in transmission and measures for distortion less transmission.

1.13 Explain the terms time domain and frequency domain with examples.

1.14 Classify different types of noise.

1.15 List the various types of external noise and briefly explain

1.16 List the various types of internal noise and briefly explain

1.17 Distinguish between internal and external Noise.

1.18 Define Signal to Noise Ratio, Noise Figure and Noise Temperature.

2.0 Principles of Analogue Modulation Techniques

2.1 Derive the time domain equation for an AM signal.

2.2 Define the modulation index of an AM signal.

2.3 Draw the frequency spectrum of an AM signal.

2.4 Describe the effects of over modulation.

2.5 Calculate the bandwidth of an AM signal.

2.6 Derive the relation between total power and carrier power in AM.

2.7 Explain the need for DSBSC and SSB modulation.

2.8 List the advantages and disadvantages of SSB.

2.9 List the applications of SSB.

2.10 State the need for Vestigial Side Band Modulation (VSB)

2.11 Explain Vestigial Side Band Modulation with block diagram.

2.12 Mention the applications of VSB modulation.

2.13 State the need for angle modulation.

2.14 List two types of angle modulation.

2.15 Derive the time domain equation for FM signal.

2.16 Define frequency deviation and modulation index of FM signal.

2.17 Mention the advantages of FM over AM

2.18 List the applications of AM and FM

2.19 Compare AM, FM and PM.

2.20 Explain narrow band and wide band FM.

2.21 Define pre-emphasis and de-emphasis.

2.22 Explain the need for pre-emphasis and de-emphasis in FM.

3.0 Analyze the working of transmitters and receivers.

3.1 List the requirements and specifications of transmitters.

3.2 Draw the block diagram for high level modulated transmitter and explain

3.3 Draw the block diagram of low level modulated Transmitter and explain the function of each block.

3.4 Distinguish between low level and high level modulation.

3.5 Draw the block diagram of basic SSB transmitter and explain the function of each block.

3.6 Draw the block diagram of indirect FM transmitter (Armstrong method) and explain the function of each block.

3.7 Draw the block diagram of TRF receiver and explain the function of each block.

3.8 State the limitations of TRF Receiver.

3.9 Explain the need for super heterodyning in radio receiver.

3.10 Explain the working of super heterodyne AM receiver with a block diagram.

3.11 Explain the choice of IF.

3.12 Define sensitivity, selectivity and fidelity of radio receiver

3.13 Define image frequency and image frequency rejection ratio.

3.14 Explain the need for Automatic Gain Control (AGC).

3.15 Explain the process of demodulation in AM receivers with circuit diagram.

3.16 Draw the block diagram of FM receiver and explain the function of each block.

3.17 Explain Foster-Seeley discriminator (FM demodulator).

4.0 Principles of Digital Communication

4.1 Explain analog and digital signals.

4.2 Compare analog and digital communication techniques

4.3 Draw and explain the block diagram of digital communication system

4.4 Mention the advantages of digital communication system over analog system

4.5 Define information capacity of a channel.

4.6 State sampling theorem and explain its significance.

4.7 Classify pulse modulation techniques.

4.8 Explain PAM, PWM and PPM with waveforms

4.9 Explain the generation and demodulation of PAM with block diagram.

4.10 List the advantages and disadvantages of PAM.

4.11 Explain the generation and demodulation of PWM with block diagram.

4.12 List the advantages and disadvantages of PWM

4.13 List the advantages and disadvantages of PPM

4.14 Compare PAM, PWM and PPM.

4.15 Define Pulse Code Modulation (PCM)

4.16 Explain the method of generation of PCM with a block diagram

4.17 Explain the process of quantization in PCM

4.18 Analyze the definitions of quantization error and quantization noise in PCM

4.19 Explain the method of demodulation of PCM signal with a block diagram

4.20 Explain Delta Modulation with a block diagram

4.21 Compare Delta Modulation and PCM

5.0 Analyze Digital Modulation Techniques

5.1. State the need for digital modulation

5.2. Explain the difference between bit rate and baud rate

5.3. List the three basic types of digital modulation techniques.

5.4. Define ASK, FSK and PSK

5.5. Explain ASK modulator with block diagram.

5.6. Explain ASK coherent demodulator with block diagram

5.7. List the merits and demerits of ASK

5.8. Explain Binary FSK (BFSK) modulator with block diagram.

5.9. Explain Coherent BFSK demodulator.

5.10. List three merits and demerits of FSK.

5.11. Draw and explain Binary PSK (BPSK) modulator.

5.12. Draw and explain BPSK demodulator.

5.13. List the advantages of BPSK

5.14. Compare ASK, FSK and PSK.

5.15. Explain Quadrature Amplitude Modulation (QAM) with constellation diagram.

5.16. Mention the applications of different digital modulation techniques

5.17. State the need for error control coding

5.18. List different types of errors during data transmission.

5.19. Mention different error detection and correction techniques

6.0 Engineering Applications.

6.1 Solve simple problems relating to noise, Signal to Noise Ratio (SNR), Noise Figure and Noise Temperature.

6.2 Solve problems on total power and carrier power in AM systems.

6.3 Simple problems on AM equation and bandwidth of AM systems.

6.4 Simple problems on FM equation, modulation index, frequency deviation and Bandwidth of FM systems.

6.5 Mention various applications of digital communication systems

6.6 Classify different telephone systems

6.7 Explain Internet telephony/IP telephony (VOIP).

6.8 State the need for a modem in data communication

6.9 List different types of modems and their use

6.10 List types of broadband access technologies.

6.11 List the types of multiplexing techniques

6.12 Explain Frequency Division Multiplexing (FDM)

6.13 Explain Time Division Multiplexing (TDM)

6.14 Explain the use of TDM and FDM in Telephony

6.15 State the need for multiple access techniques

6.16 List the three types of multiple access techniques

6.17 Explain Frequency Division Multiple Access (FDMA) with a block diagram

6.18 List the features of FDMA

6.19 Explain Time Division Multiple Access (TDMA) with a block diagram

6.20 List the features of TDMA

6.21 Explain Code Division Multiple Access (CDMA) technique with a block diagram.

6.22 List the features of CDMA

6.23 List the advantages of CDMA

6.24 Compare FDMA, TDMA and CDMA

REFERENCE BOOKS:

1. Electronic Communication System by George Kennedy- Bernard Davis Tata McGraw Hill Education Private Limited
2. Principles of Electronic Communication Systems by Herbert Taub & Donald L Schilling, 3rd Edition-2009.McGraw Hill Education (India) Private Limited
3. Radio communication by G.K.Mithal- Khanna publishers
4. Digital and analog communication systems, K.Sham Shanmugam, Wiley India,
5. Introduction to Analog & Digital Communications, 2ed, Haykin, Wiely India,
6. Analog and Digital Communication by T L Singhal, Tata McGraw Hill.
7. Electronic Communications Systems by Tomasi, Pearson Education
8. Communication Systems (Analog and Digital) by Sanjay Sharma, Kataria Publications

Student Activities:

1. Student visits Library to refer to different communication systems.
2. Student inspects the available equipment in the Lab to identify transmitters and receivers.
3. Visit nearby radio stations to familiarize with transmitters characteristics.
4. Demonstrate Amplitude modulation and demodulation.
5. Demonstrate Frequency modulation and demodulation.
6. Demonstrate about Digital Communication techniques
7. Demonstrate about Digital modulation techniques
8. Demonstrate about Digital demodulation techniques
9. Quiz.
10. Group discussion.
11. Surprise test.
12. Skill Upgradation

Execution Note:

1. Maximum of 3 students in each batch for student activity
2. Any 3 activities (either from the list given or any similar activities) shall be assigned among Different batches; may be assigned by the teacher based on interest of the students.
3. Project activities shall be carried out throughout the semester and present the project report at the end of the semester; concerned teacher is expected to observe and record the progress of student activities.
4. Submit qualitative hand-written report not exceeding 5 pages; one report per batch
5. Each of the activity can be carried out well in advance, however, Demonstration / presentation should be done during laboratory sessions.
6. Assessment shall be based on quality of work as prescribed by the following rubrics table

Dimension	Scale					Marks (Example)
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	
1. Research and gathering information	Does not collect information relate to topic	Collects very limited information, some relate to topic	Collects basic information, most refer to the topic	Collects more information, most refer to the topic	Collects a great deals of information, all refer to the topic	3
2. Full-fills team roles and duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs almost all duties	Performs all duties of assigned team roles	2
3. Shares work equality	Always relies on others to do the work	Rarely does the assigned work, often needs reminding	Usually does the assigned work, rarely needs reminding	Always does the assigned work, rarely needs reminding.	Always does the assigned work, without needing reminding	5
4. Listen to other team mates	Is always talking, never allows anyone to else to speak	Usually does most of the talking, rarely allows others to speak	Listens, but sometimes talk too much,	Listens and talks a little more than needed.	Listens and talks a fare amount	3

1. http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in
4. www.vlab.co.in

CO PO MAPPING MATRIX

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Interpret the Terminologies of Communication Systems.	R/U/A	1,2,3	10
CO2	Compare AM ,FM and PM Communication Systems.	R/U/A	1,2,3,6	15
CO3	Analyze the working of AM and FM Radio Transmitters and Receivers.	U/A	1,2,3,6	10
CO4	Apply the knowledge on Pulse Modulation techniques	R/U/A	1,2,3,6,7	15
CO5	Distinguish the various Digital Modulation Techniques	U/A	1,2,3,6, 7	13
CO6	Analyze Engineering Applications of Analog and Digital Communication.	U/A	2,3,4,7	12

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R(1 Mark)		U(3 Marks)	A(5 Marks)	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3	5, 6	9(b)	13(b)
					11(a)	15(a)
					11(b)	15(b)
6	VI			7,8	10(b)	14(b)
					12(a)	16(a)
					12(b)	16(b)
Total Questions		8		8	8	

BOARD DIPLOMA EXAMINATIONS, (C-21)
EC-304 Communication Systems
DECE III SEMESTER EXAMINATION,
MID SEMESTER – I MODEL PAPER

Time: 1 hour **Total Marks:20**

PART-A

Answer <u>All</u> questions. Each carries 1 mark. 4x1=4 Marks

1. Define Amplitude Modulation
2. Draw the waveform of FM
3. State the need for angle modulation
4. Define pre-emphasis and de-emphasis

PART-B

Answer ALL questions. Each carries 3 marks. 2X3=6 Marks

5.a State the need for modulation in communication system

(OR)

5.b Distinguish between internal noise and external noise

6.a Explain the need for DSBSC and SSB modulation

(OR)

6.b Compare AM and FM

PART-C

Answer ALL questions. Each carries 5 marks. 2X5=10 Marks

7.a Draw the block diagram of communication system and explain the function of each block

(OR)

7.b Explain the terms time domain and frequency domain with examples

8.a Derive the time domain equation for an AM signal

(OR)

8.b Explain narrow band and wideband FM

BOARD DIPLOMA EXAMINATIONS, (C-21)
EC-304 Communication Systems
DECE III SEMESTER EXAMINATION,
MID SEMESTER – II MODEL PAPER

Time: 1 hour **Total Marks:20**

PART-A

Answer <u>All</u> questions. Each carries 1 mark. **4x1=4 Marks**

1. List the specifications of transmitters
2. Define sensitivity of radio receiver
3. State sampling theorem
4. List the advantages of PAM

PART-B

Answer ALL questions. Each carries 3 marks. **2X3=6 Marks**

5.a. Explain the need for super heterodyning in radio receiver

(OR)

5.b. Explain the need for automatic gain control (AGC)

6.a. Explain the generation of PAM with a block diagram

(OR)

6.b. Compare PAM, PWM and PPM

PART-C

Answer ALL questions. Each carries 5 marks. **2X5=10 Marks**

7.a. Draw the block diagram of high level modulated transmitter and explain

(OR)

7.b. Explain the working of super heterodyne AM receiver with a block diagram

8.a. Draw and explain the block diagram of digital communication system

(OR)

8.b. Explain the method of generation of PCM with a block diagram

8.(b) Explain NRZ line coding techniques .

BOARD DIPLOMA EXAMINATION, (C-21)

EC-304 COMMUNICATION SYSTEMS

SEMESTER END EXAM (SEE) - MODEL QUESTION PAPER

Time: 2 Hours Total Marks: 40

Answer all questions. Each question carries one mark. 1x8 = 8M

1. Draw the block diagram of basic communication system.
2. Define selectivity and fidelity of a radio receiver.
3. List any two advantages of BPSK.
4. State the significance of sampling theorem.
5. Define Amplitude Shift Keying.
6. List the advantages of BPSK
7. State the need for a modem in data communication.
8. List the features of TDMA.

PART-B

Answer all questions. Each question carries three marks. 3x4=12M

9.(a) Explain time domain and frequency domain of a signal .

OR

9.(b) Explain about ASK coherent demodulator.

10.(a) Explain the process of demodulation in AM receivers.

OR

10.(b) Explain the use of FDM and TDM in telephony

11.(a) Explain FSK modulator with block diagram.

OR

11.(b) Compare ASK, FSK and PSK.

12.(a) The signal power at the input to a receiver is 6.2 μW and the noise power at the input to the receiver is 1.8 μW. Find Signal to Noise Ratio in db.

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OR

12.(b) Explain about Internet Telephony.

PART-C

Answer all questions. Each question carries five marks. 5x4=20M

13.(a) Explain frequency spectrum and mention the uses of different frequencies

OR

13.(b) Draw and explain BPSK demodulator.

14.(a) Draw the block diagram of super heterodyne AM receiver.

OR

14.(b) Explain TDMA with block diagram.

15.(a) Draw and explain BPSK modulator.

OR

15.(b) Explain ASK modulator with a block diagram.

16.(a) A modulating signal $\mathbf{m(t)=10\cos(2\pi \times 10^3 t)}$ is amplitude modulated with a carrier signal $\mathbf{c(t)=50\cos(2\pi \times 10^6 t)}$. Find the frequency of message signal, Frequency of carrier signal and modulation index of AM

.OR

16.(b) Explain about FDMA with a block diagram

EC-305-NETWORK ANALYSIS

Course Title	Network Analysis	Course Code	EC-305
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours:	75
CIE	60 Marks	SEE	40 Marks

Pre requisites :

This course requires the basic knowledge of Basic Physics and Mathematics at Secondary school level

Course Outcomes:

After completion of the course the student should be able to

CO1 :	Solve simple problems related to Ohm's law, KVL and KCL
CO2 :	Apply Mesh current and Node voltage methods to simplify and find solution to electrical circuits
CO3 :	Solve simple problems on DC transients
CO4 :	Design simple passive filters and attenuators for given specifications
CO5 :	Find various two port parameters of simple Two port networks
CO6 :	Apply various Network theorems to simplify and find solution to electrical circuits

Course Content:

Unit 1: Basics of electrical Circuits:

Duration:12 Periods (L:9-T:3)

Active and passive elements- resistance, capacitance and inductance parameters, Calculations- Energy source and classify the energy sources- Source Transformation ,Voltage source to Current source and vice versa-Star and Delta configurations of resistances-Formulas from Star to Delta & Delta to Star (no derivation)-Solve simple problems on Star/Delta and Delta/Star transformation. Introduction to Alternating voltages and currents-Phasor representation of alternating quantities –Phasor relationships for circuit Elements-Impedance and Admittance of circuit elements-AC analysis of series RL,RC circuits.

Unit 2: Mesh current and Node voltage analysis:

Duration:14 Periods (L:11-T:3)

Concept of graph of a network - branch, nodes, junction and loop in circuits- Mesh currents-Number of mesh equations required to solve the given Network- Mesh current equations for a

given network and arrange them in matrix form-Solve for mesh currents using Crammer's rule- Nodes in a network- Number of node voltage equations- Node voltage equation for a given network and arrange them in matrix form- Node voltages using Crammer's rule

Unit 3: Network theorems and Resonance:

Duration:14 Periods (L:11-T:3)

Thevenin's, and Norton's theorems - Solve networks- Use of above theorems in electronic circuits- Superposition theorem - Maximum power transfer theorems-Solve simple problems using the above theorem- Importance of impedance matching for maximum power transfer- Reciprocity theorem- Importance of Reciprocity theorem - advantages and limitations of above theorems- Resonance in A.C. Circuits - Series and parallel resonance. - curves, effect of resistance on Q factor selectivity and bandwidth.

Unit 4: Transient analysis and Linear Wave shaping:

Duration:12 Periods (L:8-T:4)

Initial conditions, steady state and transient- DC response for an RL circuit- Expression for current for an RL circuit- DC response for an RC circuit- Expression for current for an RC circuit- DC response for an RLC circuit-Solve simple problems on series RL,RC circuits of DC excitation- Linear Wave shaping -RC differentiator circuit - Input/output waveforms for RC differentiator circuit- RC integrator circuit- Input/output waveforms for RC integrator circuit

Unit 5: Two port networks:

Duration:12 Periods (L:9-T:3)

Definition of port.- Open circuit impedance (Z) parameters with equivalent circuit.- Short circuit admittance(Y) parameters with equivalent circuit-Explain the hybrid (h) parameters with equivalent circuit- Conditions for symmetry in terms of Z,Y, h, parameters- conditions for reciprocity in terms of Z, Y, h, - Z- parameters for a given T-network and Y parameters for a π-network- Inter Relationships of different parameters-Examples for symmetric networks- Examples for Reciprocal networks

Unit 6: Filters and Attenuators

Duration:11Periods (L:8-T:3)

Definition of neper, decibel, characteristic impedance, propagation constant, Attenuation- Definition of filter- LPF, HPF, BPF, BSF- Characteristic curves for the above- Expression for characteristic impedance for T and π network- Expression for fc for constant k-LPF, HPF- Design of a simple LPF and HPF for a given cut off frequency and given impedance- Design of a T-type attenuator for the given attenuation and characteristic impedance.- Design of a π-type attenuator for the given attenuation and characteristic impedance- Equalizer circuit-.- Applications of equalizer circuit.

Suggested Learning Outcomes:

After completing the course student will be able to

1.0 Basics of electrical circuits and Kirchhoff's laws

1.1 Define active and passive elements.

1.2 Resistance, capacitance, inductance parameters and their equivalent value calculations.

1.3 Define energy source and classify the energy sources.

1.4 Explain ideal voltage source and ideal current source

1.5 Convert voltage source to current source and vice versa (Source Transformation).

1.6 Explain star and Delta configurations of resistances.

1.7 Give transformation formulas from Star to Delta & Delta to Star (no derivation).

1.8 Solve simple problems on Source Transformation, Star/Delta and Delta/Star transformation.

1.9 Explain Phasor representation of sinusoids.

1.10 Derive the expression for I,Z, and power in an R-L series circuit.

1.11 Draw the vector and phasor diagrams for the above.

1.12 Derive the expression for I,Z, and power in an R-C series circuit.

1.13 Draw the vector and phasor diagrams for the above.

1.14 Derive the expression for I,Z, and power in an R-L-C series circuit.

1.15 Draw the vector and phasor diagrams for the above.

1.16 Explain the methods for solving parallel circuits.

2.0 Mesh current analysis and Node voltage analysis

2.1 Explain the concept of graph of a network

2.2 Define, branch, nodes, junction and loop in circuits.

2.3 Identify the mesh currents.

2.4 Determine the number of mesh equations required to solve the given Network

2.5 Write the mesh current equations for a given network and arrange them in matrix form.

2.6 Solve for mesh currents using Crammer's rule.

2.7 Identify the nodes in a network.

2.8 Determine the number of node voltage equations.

2.9 Write the node voltage equation for a given network and arrange them in matrix form.

2.10 Solve for node voltages using Crammer's rule.

2.11 Explain duality of a network

2.12 Draw the dual of given network.

2.13 Explain the concept of graph of a network

3.0 Network theorems and Resonance

3.1 State Thevenin's and Norton's theorem.

3.2 Apply the above theorems to solve networks.

3.3 Explain the use of above theorems in electronic circuits

3.4 State superposition theorem

3.5 Solve simple problems using the above theorem

3.6 State Maximum power transfer theorem.

3.7 Solve simple problems using the above theorem.

3.8 Explain the importance of impedance matching for maximum power transfer.

3.9 State Reciprocity theorem

3.10 Explain the importance of Reciprocity theorem by giving examples like Co axial cable and flat twin lead cable used in Television systems.

3.11 List the advantages and limitations of above theorems.

3.12 Explain resonance in RLC series circuit

3.13 Derive the formula for series resonance

3.14 State the conditions for series resonance

3.15 Define bandwidth of a resonant circuit

3.16 Define lower cut off and upper cut off frequencies

3.17 Give formula for lower cut off and upper cut off frequencies

3.18 Solve simple problems on series Resonance.

3.19 Explain Resonance in parallel circuits

3.20 State the conditions required for parallel resonance

3.21 Derive Equation for resonant frequency.

3.22 Compare Series and parallel resonance

3.23 Solve problems on Resonance

3.24 Explain effect of Resistance on Bandwidth.

4.0 Transient analysis and Linear Wave shaping.

4.1 Define the terms initial conditions, steady state and transient.

4.2 Explain the dc response for an RL circuit.

4.3 Derive expression for current for an RL circuit.

4.4 Explain the dc response for an RC circuit.

4.5 Derive expression for current for an RC circuit.

4.6 Explain the dc response for an RLC circuit.

4.7 Solve simple problems on series RL, RC circuits of DC excitation.

4.8 Explain RC differentiator circuit

4.9 Draw input/output waveforms for RC differentiator circuit

4.10 Explain RC integrator circuit

4.11 Draw input/output waveforms for RC integrator circuit

5.0 Two port networks

5.1 Define port.

5.2 Explain the open circuit impedance (Z) parameters with equivalent circuit.

5.3 Explain the short circuit admittance(Y) parameters with equivalent circuit.

5.4 Explain the hybrid (h) parameters with equivalent circuit.

5.5 Give the conditions for symmetry in terms of Z, Y, h parameters.

5.6 Give conditions for reciprocity in terms of Z, Y, h parameters

5.7 Find the Z- parameters for a given T- network and Y parameters for a π-network

5.8 Express Z- parameters in terms of Y- parameters

5.9 Express Y- parameters in terms of Z- parameters

5.10 Give Examples for symmetric networks

5.11 Give Examples for Reciprocal networks

6.0 Filters and attenuators

6.1 Define neper, decibel, characteristic impedance, propagation constant, Attenuation

6.2 Define filter, LPF, HPF, BPF, BSF.

6.3 Draw the characteristic curves for the above

6.4 Derive the expression for characteristic impedance for T and π network.

6.5 Give the expression for fc for constant k-LPF, HPF.

6.6 Design a simple LPF and HPF for a given cut off frequency and given impedance.

6.7 Design a T-type attenuator for the given attenuation and characteristic impedance.

6.8 Design a π-type attenuator for the given attenuation and characteristic impedance.

6.9 Define the equalizer circuit

6.10 Draw the circuit of equalizer circuit.

6.11 List the applications of equalizer circuit.

RECOMMENDED BOOKS

1. Engineering circuit analysis by W.H.Hayt, J.E. Kemmerly and S.M. Durbin, Tata Mc Graw Hill, New Delhi.
2. Fundamentals of Electric circuits by Charles K. Alexander and Matthew N.O. Sadiku,Mc Graw Hill publishers.
3. Network Analysis by M.E Van Valkenberg, Prantice Hall India, 3rd Edition
4. Electric Circuits -Joseph Edminister ,Schaum Series publishers.
5. Circuit Theory (Analysis and Synthesis)-Chakrabarthi

Suggested E-Learning references

1. www.allaboutcircuits.com
2. http://electrical4u.com
3. www.electronics-tutorials.ws
4. www.nptel.ac.in

CO-PO MAPPING MATRIX

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Solve simple problems related to Ohm's law, KVL and KCL	R/U/A	1,2,10	**12**
CO2	Apply Mesh current and Node voltage methods to simplify and find solution to electrical circuits	R/U/A	1,2,5,6,7	**14**
CO3	Solve simple problems on DC transients	R/U/A	1,2,9	**14**
CO4	Design simple passive filters and attenuators for given specifications	R/U/A	1,2,5,7	**12**
CO5	Find various two port parameters of simple Two port networks	R/U/A	1,2,5	**12**
CO6	Apply various Network theorems to simplify and find solution to electrical circuits Design simple passive filters and attenuators for given specifications	R/U/A	1,2,3,7	**11**

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R(1 Mark)			U(3 Marks)	A(5 Marks)	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
					12(a)	16(a)	
					12(b)	16(b)	
Total Questions		8			8	8	

Model Paper for Mid-I,

BOARD DIPLOMA EXAMINATION, (C-21)

III SEMESTER, EC-305

NETWORK ANALYSIS

Time :**1** Hr Total Marks :20Marks

PART-A

Answer **all** questions, each carries **one** marks 4 X 1 = 4

1. Define Active and Passive elements.
2. Define Impedance.
3. Define branch and node.
4. Define admittance.

PART-B

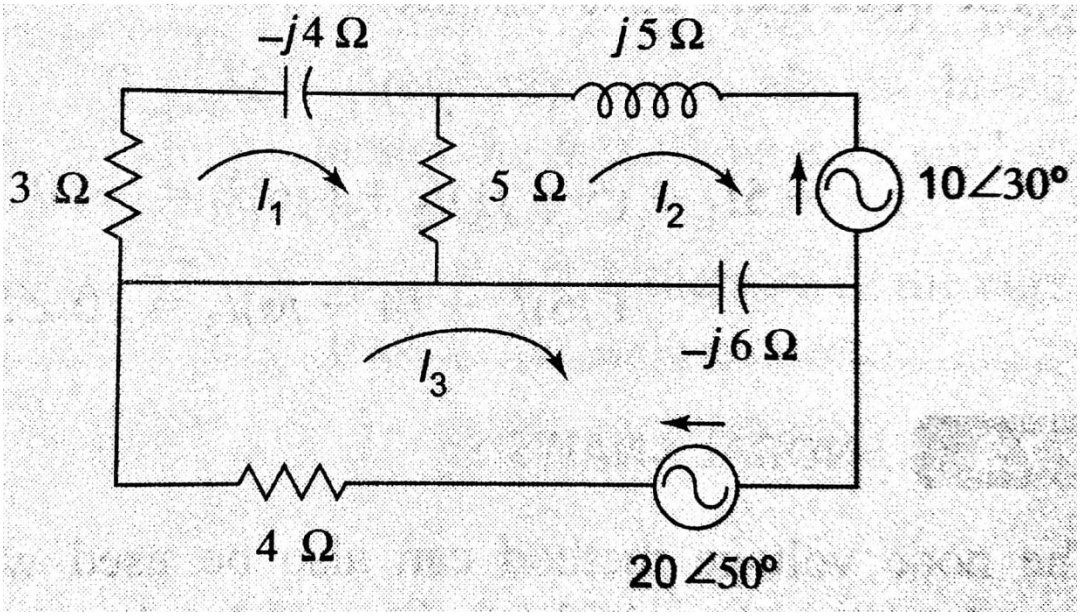
Answer **all** questions,each carries **three** marks 2 X 3 = 6

5. a) Explain Importance of sinusoid as an AC forcing function

OR

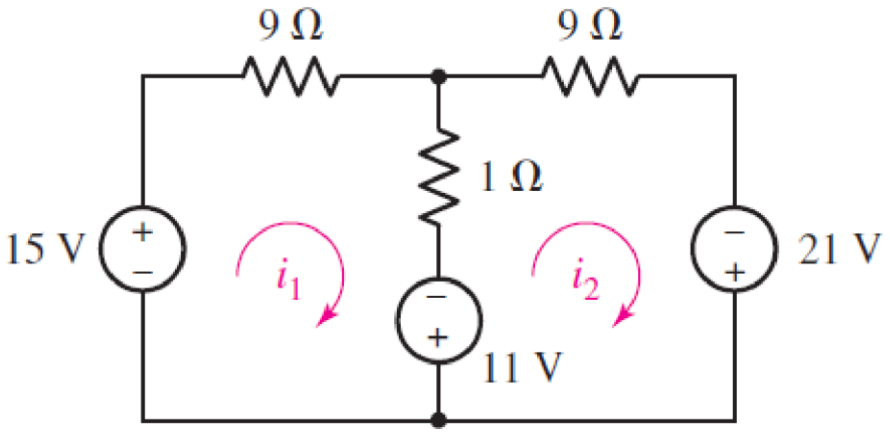
b) Derive relationship between phasor voltage across and phasor current through an inductor.

6. a) For the given circuit write the mesh equations in matrix form and find the value of I_1.



OR

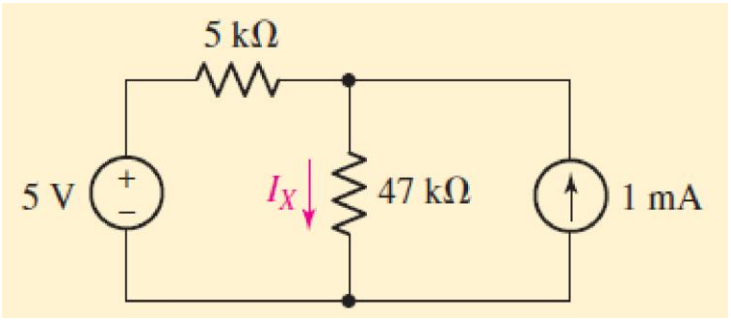
b) find the mesh currents in the given circuit.



PART-C

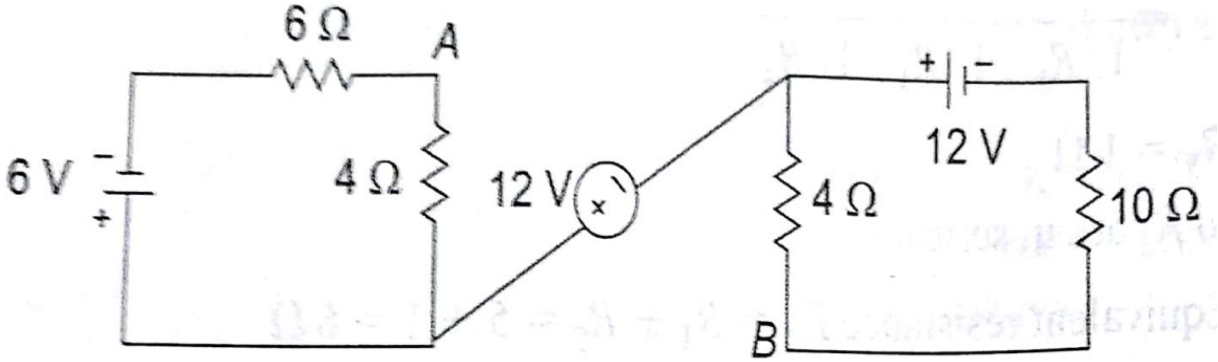
Answer any **all** questions, each carries **five** marks 2 X 5 = 10

7. a) Apply source transformation technique to find out current flowing through 47 kΩ resistor

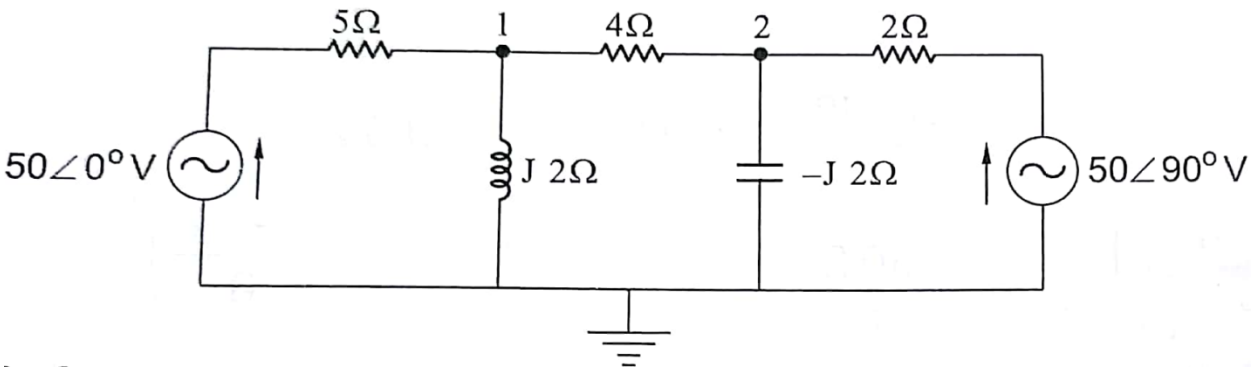


OR

b) Apply KVL to find the voltage between points A and B in the given circuit.

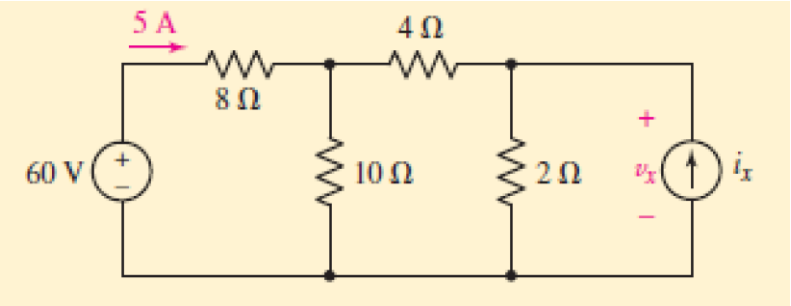


8. a) Find the voltages at node1 and node2 by using node analysis



OR

b) Determine the value of v_x in the given circuit.



Model Paper for Mid-II,

BOARD DIPLOMA EXAMINATION, (C-21)

III SEMESTER, EC-305

NETWORK ANALYSIS

Time :**1** Hr Total Marks:20Marks

PART-A

Answer **all** questions, each carries **one** marks 4 X 1 = 4

1. Define time constant of RL circuit and mention its units.
2. State Norton's Theorem .
3. Define Resonance.
4. Draw Differentiator circuit.

PART-B

Answer any **all** questions, each carries **three** marks 2 X 3 = 6

5. a) Explain the transient analysis of RC circuit for DC excitation.

OR

b) Explain about RC differentiator circuit

6. a) State Maximum Power Transfer theorem and state its importance.

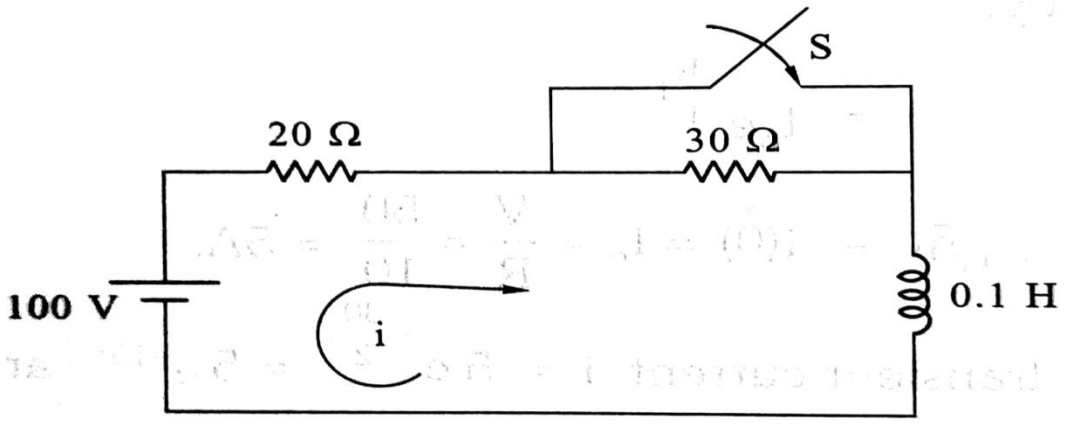
OR

b) Compare series resonance and parallel resonance.

PART-C

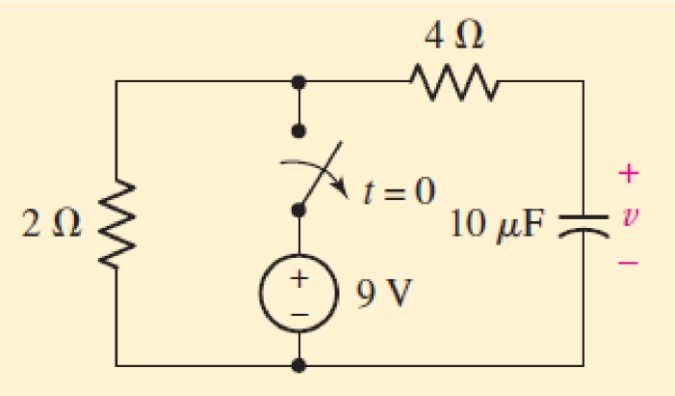
Answer any **all** questions, each carries **five** marks 2 X 5 = 10

7. a) For the circuit shown find the complete expression for current when the switch is closed at time t = 0.

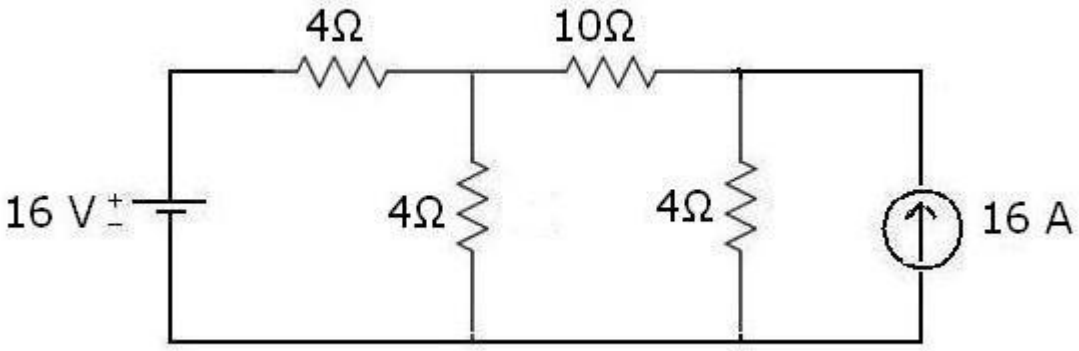


OR

b) Find the voltage across the capacitor at time t = 200 μs.



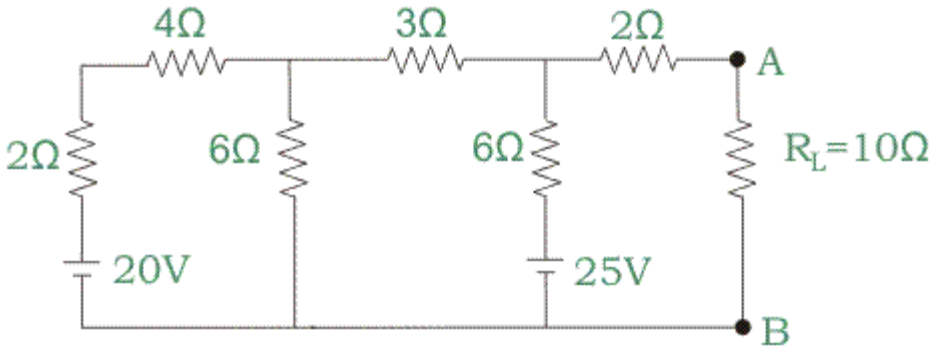
8. a)Find the current flowing through 20 Ω resistor of the following circuit using superposition theorem.



.

OR

b) Find the current flowing through a load resistor 10 ohm using Thevenin's theorem.



Model Paper for SEE

BOARD DIPLOMA EXAMINATION, (C-21)

III SEMESTER, EC-305

NETWORK ANALYSIS

Time :**2**Hrs Total Marks : 40Marks

PART-A

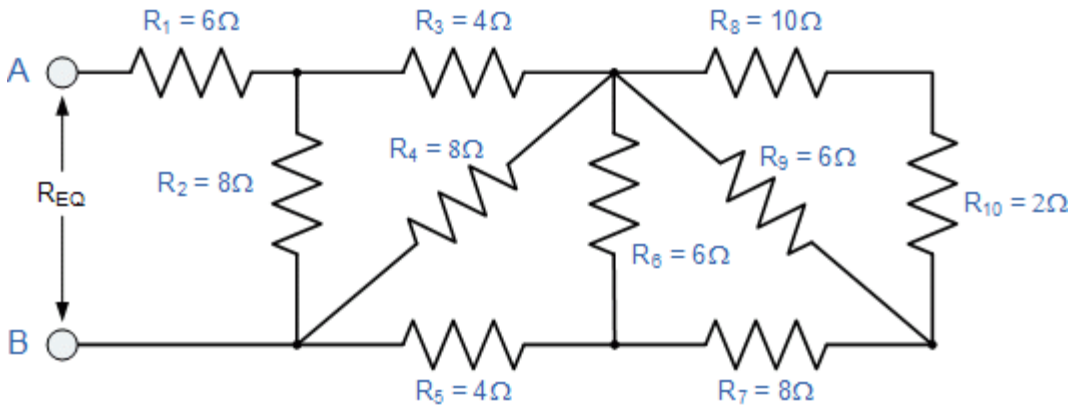
Answer **all** questions, each carries **one** marks 8 X 1 =8

1. Define KVL and KCL.
2. Define Branch and loop of a Network.
3. Draw a two-port network and indicate voltages and currents
4. State the condition for resonance in series RLC circuit
5. State the conditions for symmetry and reciprocity for Z parameters.
6. Write two examples for Reciprocal networks.
7. List the applications of equalizers.
8. Define dB.

PART-B

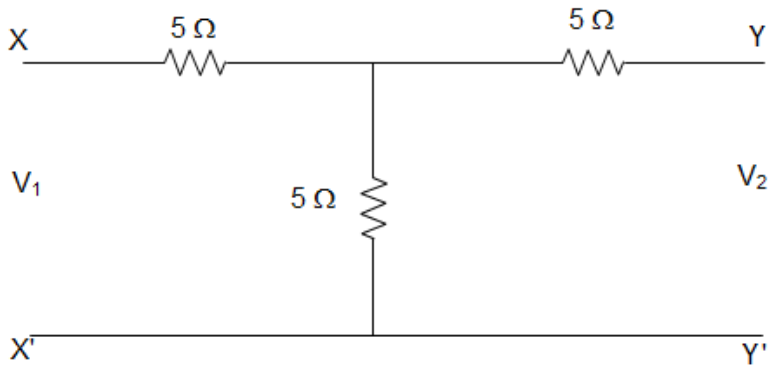
Answer any **all** questions, each question carries **three** marks 4 x 3 = 12

9. a) Find equivalent resistance.



OR

b) Find Z parameters for the following circuit



10. a) Explain the transient analysis of RL circuit for DC excitation.

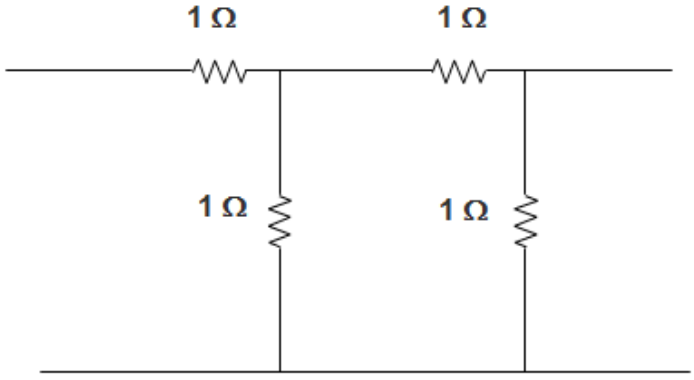
OR

b) Derive the expression for the cutoff frequency f_c for constant K low pass filter.

11. a) Derive the expressions for Z parameters in terms of Y parameters.

OR

b) Find Y parameters for the following circuit



12. a) Derive the equation for characteristic impedance for Pi network.

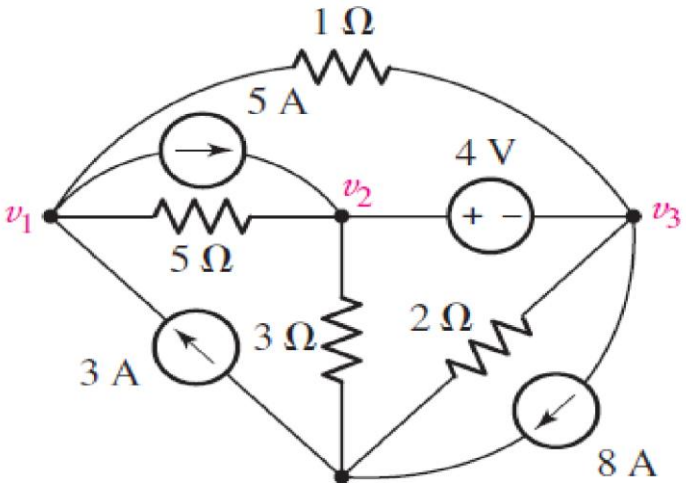
OR

b) Derive the expression for the cutoff frequency f_c for constant K high pass filter.

PART-C

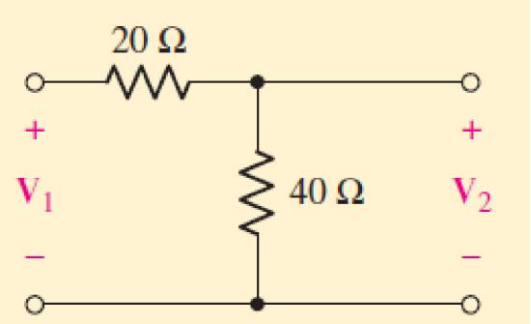
Answer any **all** questions, each question carries **five** marks 4 x 5 = 20

13. a) Apply super node analysis to find the values of v_1, v_2 and v_3 in the given circuit.



OR

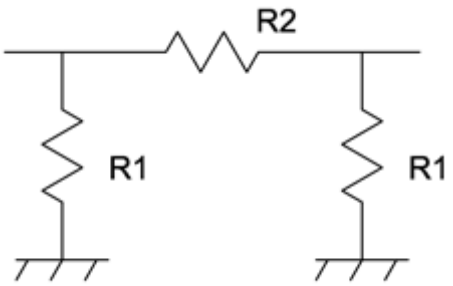
b) Find the h parameters of the given circuit.



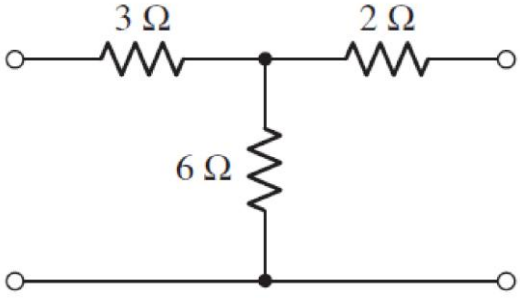
14. a) Derive resonant frequency for parallel resonance.

OR

b) Explain symmetrical pi type attenuator



15. a) Find the Z parameters for the given network.



OR

b) Derive the expressions for Y parameters in terms of Z parameters

16. a) Derive the equation for characteristic impedance for T- network.

OR

b)Explain Equalizer circuit and mention its applications

EC-306-ELECTRONIC DEVICES LAB

Course Title	Electronic Devices Lab	Course Code	EC-306
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practicals	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic skills of Handling Basic Electronics tools and Components, knowledge of connecting cables and meters

Course Contents

I. Amplifiers and Oscillators

1. Implement voltage divider bias single stage RC coupled CE amplifier and plot frequency response.
    - **a)** Observe the effect of connecting and disconnecting the emitter bypass capacitor on gain and distortion.
    - **b)** Observe the effect of emitter bypass capacitor Ce on voltage across Emitter Resistance using CRO.
    - **c)** Measure the output power using ac power meter

2. Implement Colpitt's oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.
3. Implement Hartley oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.
4. Implement transistor Astable multi vibrator circuit and observe the waveforms on CRO.

II. Special Semiconductor Devices

5. Plot the characteristics of a) Photodiode b) photo transistor
6.
    a) Implement a Twilight switch using a Phototransistor and a Relay
    b) Replace Phototransistor with LDR and Test
7.
    a) Plot the VI characteristics of different color LEDs & determine the Vf (forward voltage drop)

b) Test the above devices with DMM & Analogue multimeter and identify the Terminals

8.

a) Plot the characteristics of i) LDR ii) Thermistor iii) VDR

b) Test the above devices with DMM & Analogue multimeter

9.

a) Implement a simple Temperature controller using Thermistor and a Relay

b) Use a VDR /Trigistor for protection against high voltage surges and verify

10.

a) Plot the characteristics of opto coupler MCT2E

b) Test the given optocoupler and identify its terminals

11.

a) Use MCT 2E to switch on a 6V lamp connected to RPS by applying a Low voltage 1.5 V signal from a cell at input

b) Implement a simple timer using 1 M Ω Resistor , 1000 mfd capacitor ,Transistor BC148 and a Relay

III. Wave shaping Circuits

Realize Clipper and Clamper circuits and observe the waveforms on CRO

12.

a) Realize Series and Parallel diode clippers

b) Assemble and test Positive and negative clipper circuits with and without bias

13.

a) Implement Amplitude limiter (two diodes connected back to back) and observe the waveform on CRO.

b) Implement a Zener diode Clipper and measure the output voltage with DMM and also observe waveform on CRO

14. Implement Boot-strap sweep circuit and observe the sweep wave form.

15. Implement Miller sweep circuit and observe the waveform.

Suggested Student Activities

i. Collection of catalogues and specification sheets, preparation of a chart displaying symbols of passive components and connectors/cables.

ii. Collection of the contributors (scientists) and contribution details to the field of Electrical and Electronics engineering

iii. Any other such activities that can contribute to the student's knowledge in respect of this course.

iv. Record the best practices used in the disposal of E-waste and precautions in the operation of electrical appliances.

Course Outcome		Linked PO	
CO1	Apply the basics of transistor to construct amplifiers, oscillators and multi-vibrators and analyze the effect of circuit components	1,2,3,8,9,10	12
CO2	Identify different special semiconductor devices and apply the knowledge of special semiconductor devices in special applications	1,2,3,4,5,6,8,9,10	18
CO3	Apply the knowledge of semiconductor components in realizing and analyzing wave shaping circuits	1,2,3,4,8,9,10	15
			45

E Learning Resources

1. http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in
4. studentboxoffice.in

State Board of Technical Education and Training, Telangana

III Semester Mid Examination-I Model Question paper

DECE III semester practical Examination

Corse Code:EC-306 **Duration:2 hours**

Course Name: Electronic Devices Lab
Max.Marks:20

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration, choose appropriate values when not mentioned in the question

1. Implement voltage divider bias single stage RC coupled CE amplifier and plot frequency response. Record the effect of emitter bypass capacitor on gain of the amplifier.

   b) Implement Colpitt's oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.

   c) Implement Hartley oscillator and observe the effect of Varying the tank circuit component values and observe output waveforms on CRO. Record your observations.

4. Implement transistor Astable multi vibrator circuit and observe the waveforms on CRO and record your observations.

5. Implement the Photo diode circuit to show that the resistance of the photo diode varies with light and also measure the current through the Photodiode. Record your observations.

State Board of Technical Education and Training, Telangana

III Semester Mid Examination-II Model Question paper

DECE III semester practical Examination

Corse Code:21EC-306P **Duration:2 hours**

Course Name: Electronic Devices Lab **Max.Marks:20**

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration, choose appropriate values when not mentioned in the question

1.. Implement the Photo transistor circuit to show that the resistance of the photo transistor varies with light and also measure the current through the Photo transistor. Record your observations.

2.a) Implement a Twilight switch using a Phototransistor and a Relay

b) Replace Phototransistor with LDR and record the observations.

3. a)Plot the VI characteristics of white, red and green color LEDs & determine the Vf (forward voltage drop)

b) Test the above devices with DMM & Analogue multimeter and identify the Terminals

4.a) Plot the V-I characteristics and response characteristics of i) LDR

b) Test the above devices with DMM & Analogue multimeter

5. a) Implement a simple Temperature controller using Thermistor and a Relay

b) Use a VDR for protection against high voltage surges and verify

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DECE III semester practical Examination

Corse Code:EC-306 **Duration:3 hours**

Course Name: Electronic Devices Lab **Max.Marks:40**

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration ,choose appropriate values when not mentioned in the question

1. Implement voltage divider bias single stage RC coupled CE amplifier and plot frequency response. Record the effect of emitter bypass capacitor on gain of the amplifier.

d) Implement Colpitt's oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.

e) Implement Hartley oscillator and observe the effect of Varying the tank circuit component values and observe output waveforms on CRO. Record your observations.

4. Implement transistor Astable multivibrator circuit and observe the waveforms on CRO and record your observations.

5.Implement the Photo diode circuit to show that the resistance of the photo diode varies with light and also measure the current through the Photodiode. Record your observations.

6.. Implement the Photo transistor circuit to show that the resistance of the photo transistor varies with light and also measure the current through the Photo transistor. Record your observations.

7.a) Implement a Twilight switch using a Phototransistor and a Relay

b) Replace Phototransistor with LDR and record the observations.

8. a) Plot the VI characteristics of white, red and green color LEDs & determine the Vf (forward voltage drop)

b) Test the above devices with DMM & Analogue multimeter and identify the Terminals

9.a) Plot the V-I characteristics and response characteristics of i) LDR

b) Test the above devices with DMM & Analogue multimeter

10. a) Implement a simple Temperature controller using Thermistor and a Relay

b) Use a VDR for protection against high voltage surges and verify

11. a) Plot the characteristics of optocoupler MCT2E

b) Test the given optocoupler and identify its terminals

12. a) Use MCT 2E to switch on a 6V lamp connected to RPS by applying a Low voltage 1.5 V signal from a cell at input b) Implement a simple timer using 1 M Ω Resistor , 1000 mfd capacitor ,Transistor BC148 and a Relay

13. Construct and test Positive and negative clipper circuits with and without bias

14. Implement Amplitude limiter (two diodes connected back-to-back) and observe the waveform on CRO.

b) Implement a Zener diode Clipper and measure the output voltage with DMM and also observe waveform on CRO

15. Implement Boot-strap sweep circuit and observe the sweep wave form.

EC-307-NETWORK ANALYSIS LAB

Course Title	Network Analysis Lab	Course Code	EC-307
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours:	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of networks theorems and basic electrical concepts.

LIST OF EXPERIMENTS:

1. Verify Thevenin's theorem for a given network.
2. Verify Nortorn,s theorem for a given network.
3. Verify Maximun power transfer theorem for a given network.
4. Verify superposition theorem for a given network.
5. Using a digital LCR meter measure the values of given resistances, capacitances and inductors and the quality factor of a coil.
6. Using a CRO find out the amplitude and frequency values of a given waveform derived from a AF /RF generating instrument.
7. Observe the charge and discharge curves of using a digital CRO, determine the time constant of a given RC circuit.
8. Measure the Rise time, Fall time, duty cycle, Pulse width, Pulse amplitude, overshoot of a given Pulse on CRO.
9. Observe and sketch the waveform of a given RC differentiator network being driven by a pulse (pulse width t_d) under the following conditions. 1) **RC>> t_d** **2) RC<< t_d** **3) RC=t_d**
10. Observe and sketch the waveform of a given RC integrator network being driven by a pulse (pulse width t_d) under the following conditions of time constants. 1) **RC>> t_d** **2) RC<< t_d** **3) RC=t_d .**
11. Demonstrate the use of integrator circuit for producing triangular wave / Ramp through a square wave using a CRO.
12. Design a Low pass filter using a given Integrator circuit (RC) for a given cut off frequency say 1KHz.
13. Design a Low pass filter using a given Integrator circuit (RC) for a given cut off frequency say 2KHz.
14. Realize a series clipper and observe the waveform on a CRO.
15. Realize a parallel clipper and observe the waveform on a CRO.

16. Realize a positive clipper without bias and observe the waveform on a CRO.
17. Realize a positive clipper with bias and observe the waveform on a CRO.
18. Realize a negative clipper without bias and observe the waveform on a CRO.
19. Realize a negative clipper with bias and observe the waveform on a CRO.
20. Realize a zener diode clipper and observe the wave form on a CRO.
21. Realize a Clamper circuit and observe the input and output waveforms on CRO.
22. Plot the resonance curve of a given series tuned circuit.
23. Plot the resonance curve of a given parallel tuned circuit.

E-Learning:

1. http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in

EC-308-Digital Electronics Lab

Course Title	Digital Electronics Lab	Course Code	EC-308
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact /Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic skills of Handling bread boards and PCB.

Course outcomes:

On successful completion of the course, the students will be able to attain below Course Outcome

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Identify Basic Gates and Logic Families	R/U/A	1,2,3,4,5,6,7,8	**9**
CO2	Realization of Boolean Functions using Gates	R/U/A	1,2,3,4	**15**
CO3	Verification of truth tables of Multiplexers and DeMultiplexers/encoder, BCD decoder.	R/U/A	1,2,3	**9**
CO4	Flip Flops & Timing Circuits Counters & Shift Registers	A	1,2,3,10	**12**
				45

Course Contents:

I. Basic Gates and Logic Families

1. **Identify Digital ICs and noting down pin details from data sheets**

a) Identify the given digital ICs and draw the pin diagrams. (Use TTL and CMOS ICs of AND, OR,NOT, NAND, NOR and XOR gates with two and three inputs).

b) Realize basic gate functions using toggle switches and a bulb.

2. **Verify the truth tables of basic gates using universal gates.**

a) Verify the truth table of 7403 IC (open collector quad 2input NAND gate).

b) Verify the Truth table of 4073 IC.

3.

a) Implement OR gate using NAND gates only and verify the Truth Table

b) Implement NOT gate using using NOR gates only and verify the Truth Table

4.

a) Verify the truth table of AND gate using NOR gates only.

b) From the data sheets find out CMOS equivalent of above ICs.

II. Realizing Boolean Functions.

5.

a) Verify the truth table of XOR using TTL NAND gates only.

b) Verify the truth table of XOR using CMOS NOR gates only.

c) From the data sheets find out CMOS Equivalent of XOR ICs.

6.

a) Implement a given Boolean function using basic gates and verify the truth table.

b) Implement a given Boolean function using NAND gates only and verify the truth table.

7.

a) Verify the truth table of half adder using basic gates only.

b) Verify the truth table of half adder using NAND gates only.

8.

a) Verify the truth table of full adder using 2 half adders.

b) Implement a full adder using NOR gates only.

III. Realization of Boolean Functions using Multiplexers and Demultiplexers

9. a) Verify the truth table of IC 74153MUX.

   b) Verify the truth table of IC 74154 DE-MUX.

10. a) Verify the function of 74148 Encoder and write the truth table

    b) Verify the function of 74138 Decoder and write the truth table

11. a) Verify the to decimal decoder and write function of BCD its truth table.

    b) Verify the function of decimal BCD to encoder and write its truth table.

IV. Flip Flops &Sequential Circuits

12. a) Construct clocked RS FF using NAND gates and Verify its truth table.

    b) Verify the truth table of CD 4013 Dual D flip Flop

13. a) Verify the functionality and truth table of 74L71 RS flip flop with Preset and Clear

    b) Verify the Truth table of JK FF using 7476 IC.

14. a) Construct and verify the function of decade counter using 7490 ICs.

    b) Verify the function of up/down counter using 74190, 74193

15. a) Verify the function of CD 4029 up/down counter.

    b) Verify the function of shift register (ICs like 7495or 74194 etc.)

    c) Verify the function of Johnson counter using CD 4017 IC

EC-309 - CIRCUIT DESIGN & SIMULATION LAB

Course Title	Circuit Design & Simulation Lab	Course Code	EC-309
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practicals	Total Contact Period :	45
CIE	60 Marks	SEE	40 Marks

Pre requisites :

This course requires the knowledge of basic understanding of Electronic Devices and Circuits, Digital Electronics and Analog Communications

Course outcomes

Course Outcome		Linked PO	Teaching Hours
CO1	Practice with Simulation software like ORCAD/MULTISIM/PSPICE Environment	1,2,3,4,5,6,7	15
CO2	Design and verify the results of various electronic circuits using Simulation software and verify the result	1,2,3,4,10	15
CO3	Demonstrate Skills using ORCAD / MULTISIM/PSpice to simulate Network Theorems	1,2,3,4,10	10
CO4	Demonstrate Skills using ORCAD / MULTISIM/PSpice to simulate Modulation Techniques	1,2,3,4,8,9,10	5

Course Contents:

Unit-1: Practice with Simulation software like ORCAD/MULTISIM/PSpice Environment

1. Familiarize ORCAD suite/MULTISIM/PSpice/ environment
2. Use various tool bars such as standard toolbar, main toolbar, simulation toolbar, view tool bar components toolbar, virtual toolbar, graphical annotation toolbar and instruments toolbar
3. Familiarize its features
4. Select and Place various Electronic Components and wire them
5. Draw the circuit and simulate and Debug the errors

6. Capture and simulate a potential divider circuit

Unit-2: Design and verify the results of various electronic circuits using Simulation software

7. Verify Ohm's law and simulate it using ORCAD suite/MULTISIM/PSpice/similar software
8. Design and implement a) Low pass filter with a cut off frequency of 10 kHz and b) High pass filter with a cut off frequency of 10 kHz and evaluate the performance
9. Simulate Full wave Rectifier with filter
10. Simulate Clipper and Clamper circuits
11. Design and simulate BCD to excess-3 code and vice versa using logic gates
12. Design and simulate Binary to gray and vice-versa vice versa using logic gates
13. Design and simulate 4 bit odd/even parity generator
14. Design and simulate 4 bit ripple counter with Mod-10 and Mod- 12

Unit-3: Demonstrate Skills using ORCAD / MULTISIM/PSpice to simulate Network Theorems and Modulation Techniques

15. Simulate the given AM modulation circuit

Reference Book:

1. ORCAD software User manual.
2. MULTISIM user manual
3. Electric circuits by Schaum's series
4. PSpice user manual

E Learning Resources

1. www.electronics-tutorials.ws
2. www.nptel.ac.in
3. http://www.electronics-lab.com/downloads/circutedesignsimulation
4. https://www.orcad.com

HU-310 - Communication and Life Skills Lab

Course Title	Communication and Life Skills Lab	Course Code	HU-310
Semester	III	Course Group	Practical
Teaching Scheme in Periods- L: T:P	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

Rationale:

The course is designed to impart listening skills and life skills to the students of diploma which will help them a great deal in personal and professional fronts.

Prerequisites:

The course requires the basic knowledge of vocabulary, grammar, and four language learning skills, viz. Listening, Speaking, Reading and Writing.

Course Contents

I. Listening Skills-I

Duration: 6 (L 2 P 4)

- A paragraph
- A song
- A recipe
- A dialogue

II. Life Skills – I

Duration: 6 (L2 P 4)

1. **Introduction to Life Skills**
   - What are life skills?
   - Importance of life skills
   - Practicing life skills
2. **Attitude**
   - Features of attitude
   - Attitude and behaviour
   - Attitude formation
   - Positive attitude
   - Negative attitude
   - Overcoming negative attitude
   - Attitude at workplace
3. **Adaptability**
   - Need for adaptability
   - Willingness to experiment
   - Fear of failure

- Think ahead
- Stay positive
- Open mind
- Curiosity
- Being in present

III. Listening Skills – II

Duration: 9 (L 3 P 6)

- Biography
- Interview
- A Report
- Telephone Conversation

IV. Life Skills – II

Duration: 9 (L 3 P 6)

4. Goal setting

- Importance of setting goals
- What is goal setting
- Short term goals
- Long term goals
- Achieve goals using SMART

5. Motivation

- Why motivation
- Characteristics of motivation
- Extrinsic motivation
- Intrinsic motivation

6. Time Management

- Features of time
- Secrets of time management
- Time wasters
- Prioritisation
- Productive time
- Time Quadrant

V. Life Skills – III **Duration: 6 (L 2 P 4)**

7. Creativity

- Flexibility
- Curiosity
- Determination
- Innovative ideas

8. Critical Thinking

- Observation
- Curiosity
- Introspection
- Identify biases
- Critical Analysis

9. Problem Solving and Decision Making

- Define the problem
- Generate Options
- Evaluate and choose an option
- Implement Solution
- Monitoring and seeking feedback

VI. Life Skills – IV

Duration: 9 (L 3 P 6)

10. Leadership Qualities and Teamwork

- Significance of Leadership
- Factors of leadership
- Leadership styles
- Leadership Skills
- Importance of Teamwork
- Characteristics of a good team
- Benefits of teamwork
- Problems of teamwork
- Qualities of team player

11. Stress Management/Managing Emotions

- Components of Emotions
- Stress busters
- Managing Emotions
- Emotions at workplace

12. Core Human Values / Forming Values

- Honesty and integrity
- Work Ethics
- Ego and Respect
- Trust and Truthfulness
- Social Responsibility
- Character formation
- Designing Destiny

Course Outcomes:

	At the end of the course the students will have the ability to:
Listening Skills - I	Identify the main or the central idea. Listen for specific details. Learn the pronunciation.
Listening Skills - II	Listen for drawing inferences. Listen for accuracy. Listen to convey ideas.
Life Skills – I	Know the Life Skills. Practice life skills for a better life. Think positively. Develop positive attitude. Overcome negative attitude. Develop adaptability in any situation.
Life Skills – II	Know the importance of setting goals. Set goals using SMART features. Get inspired to get success. Get personal and professional success. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.
Life Skills – III	Learn to be creative. Think innovatively. Know the reasons for a problem. Learn to overcome problems. Learn the various techniques to solve the problems. Learn to make proper decisions on time. Think ‘out of the box’. Think critically.
Life Skills – IV	Develop trust and confidence. To develop healthy and wealthy life. Know how to be a leader. Learn the qualities of a good leader. Learn the qualities of a good team. Learn the advantages and disadvantages of a team. Differentiate between Eu-stress and Distress. Manage stress effectively.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
310.1	-	-	-	-	3		3	5,7
310.2	-	-	-	-	3	2	3	5,6,7
310.3	-	-	-	-	3	3	3	5,6,7
310.4	-	-	-	-	2	2	3	5,6,7
310.5	-	-	-	-	2	2	3	5,6,7
310.6		-	--	--	2		3	5,7

Suggested Student Activities:

- Listening Comprehension
- Seminars
- Presentations
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Find a solution to the problem
- Making innovative things through recycling
- Creating advertisements
- Five-minute activities on Life Skills
- Watching videos on life skills and making presentations
- Case studies
- Role Plays
- Dialogues

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

a. **Mid Sem- I** 20 marks
   Syllabus:
   i. Listening Skills - I
   ii. Life Skills - I

b. **Mid Sem – II** 20 Marks
   Syllabus:
   i. Listening Skills - II
   ii. Life Skills - II

c. **Internal assessment**: 20 marks

i. Seminars: 10 marks

ii. Assignments: 5 marks

iii. Lab record submission: 5 marks

II. Semester End Examination : 40 Marks

a. Listening: 10 Marks

b. Life Skills topics: 15 Marks

c. *Viva Voce* : 15 Marks

References:

a. Flint, Chrisand Jamie Flockhart*Listening: A2 (Collins English for Life: Skills)* Collins. 2013
b. Brown, Stephen E. English in Everyday Life. McGraw-Hill Education.2008
c. Mohanraj, Jayashree. *Let Us Hear Them Speak: Developing Speaking-Listening Skills in English*.Sage. 2015
d. Susan Earle – Carlin. *Q Skills for Success: Listening and Speaking 5: Student Book with Online Practice*. Oxford University Press. 2013
e. Kumar, Sanjay and Pushpa Latha. *Communication Skills: A Work Book*.Oxford University Press. 2018
f. Carnegie, Dale.*The Leader in You*. Simon & Schuster: 1995
g. Carnegie, Dale.*The Art of Public Speaking*. Prabhat Prakashan. NewDelhi.2013
h. Kaye, Martin. *Goal Setting (Workbook Included): Goals & Motivation: Introduction To A Complete & Proven Step-By-Step Blueprint For Reaching Your Goals (Goal Setting Master Plan 1)*. Kindle Edition. MK Coaching.2016.
i. West, Steven. *Critical Thinking Skills: Practical Strategies for Better Decision making, Problem-Solving and Goal Setting.* Kindle Edition.2018
j. Tracy, Brain. *Goals*. Berret-Koehler PublishersInc. San Francisco. 2017
k. Tracy, Brain. *Master your Time Master your Life.* Penguin Random House Inc. New York. 2017
l. Sean Covey. *The 7 Habits of Highly Effective Teens.* Simon and Schuster,2011

E-Learning Resources:

a. http://www.bbc.co.uk/worldservice/learningenglish/youmeus/learnit/learnitv39.shtml
b. https://www.examenglish.com/leveltest/listening_level_test.htm
c. https://www.oxfordonlineenglish.com/listening?utm_referrer=https%3A%2F%2Fwww.google.co.in%2F
d. https://takeielts.britishcouncil.org/prepare-test/free-ielts-practice-tests/listening-practice-test-1
e. https://learnenglish.britishcouncil.org/en/listening
f. https://www.cambridgeenglish.org/learning-english/activities-for-learners/?skill=listening
g. https://www.businessenglishsite.com/business-english-listening.html

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION - I
HU-310- COMMUNICATION AND LIFE SKILLS LAB

Time : 1 Hour **Total Marks: 20 Marks**

Part – A **10 marks**

1. Listening Comprehension: 5 X 2 = 10

(Teacher should give the questions before reading the passage given below)

There are two problems which cause great worry to our educationists – the problem of religious and moral instruction in a land of many faiths and the problem arising out of a large variety of languages.

Taking up the education of children we see that they should be trained to love one another, to be kind and helpful to all, to be tender to the lower animals and to observe and think right. The task of teaching them how to read and write and to count and calculate is important, but it should not make us lose sight of the primary aim of moulding personality in the right way.

For this it is necessary to call into aid, culture, tradition and religion. But in our country. we have in the same school, to look after boys and girls born in different faiths and belonging to families that live diverse ways of life and follow different forms of worship associated with different denominations of religion. It will not do to tread the easy path of evading the difficulty by attending solely to physical culture and intellectual education.

It is not right for us in India to be dissuaded from this by considerations as to overtaking the young mind. What is necessary must be done and it is not in the fact too great a burden.

On the basis of reading the above passage, answer the following questions:

1. Which two problems have our educations to face?
2. What is the primary aim of the education of children?
3.How should the problem of religious and moral instruction be dealt with?
4. Which basic training is the writer talking about?
5. How can we serve the spiritual needs of school children?

PART- B **10 Marks**

Instruction: Answer any one of the questions in 150 words.

2. What are the benefits of developing an optimistic sense towards your life?
3. Give an instance from your life when you adapted yourself to a new situation.

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION - II
HU-310- COMMUNICATION AND LIFE SKILLS LAB

Time : 1 Hour **Total Marks: 20 Marks**

Part – A **10 marks**

1. Listening Comprehension: 5 X 2 = 10

(Teacher should give the questions before reading the passage given below)

Isaac Newton figured out why objects fall to the ground and why the planets move the way they do. Isaac Newton was born in Lincolnshire, England, in 1643. His father died before he was born but, despite having a difficult childhood, he gained a place at Cambridge University. When the plague broke out he was forced to stay at home and, with so much free time on his hands, Newton started to wonder about what made things fall.

Newton said that he was inspired to think about forces when he saw an apple fall from a tree. He came up with the theory of gravity, an invisible force that pulls all of the objects in the Universe together, and the reason things don't float off into the sky.

In 1685, Newton described his Laws of Motion – a mathematical guide to how an object's movement is affected by speed and mass. Two years later, Newton published his ideas about gravity in a book which contains many of the foundations of modern science.

Newton also invented a new kind of telescope called a reflector. It used a mirror to collect light instead of lenses, and was much more powerful than existing telescopes. He also showed that white light was made up of all the colours of the rainbow.

1. What did Isaac Newton find?
2. Where did Isaac Newton born?
3. Which disease broke out in his childhood?
4. What was the telescope that Isaac Newton invented?
5. From which colour rainbow is made up of?

PART- B **10 Marks**

Instruction: Answer any one of the questions in 150 words.

2. What were the short term goals which you set to yourself and how you managed to achieve them in the recent past?
3. Explain - i) how you prioritise your tasks.
   ii) how you manage your time in the best possible way.

BOARD DIPLOMA EXAMINATION (C-21)
SEMESTER END EXAMINATION
HU-310- COMMUNICATION AND LIFE SKILLS LAB

Time: 3 Hours **Total Marks: 40 Marks**

Part – A **10 marks**

1. *Listen to the following passage and answer the questions give below it.* **5 X 2 = 10**
(Teacher should give the questions before reading the passage)

Some of us think that writing is only for writers. But writing is for all of us. As Julia Cameron notes in her book The Right to Write: An Invitation and Initiation into the Writing Life, "I believe we all come into life as writers." Writing can be beneficial for all of us, because it can be therapeutic. One of the most powerful parts of therapy is cultivating the ability to observe our thoughts and feelings, said Elizabeth Sullivan, a licensed marriage and family therapist in San Francisco. And that's what writing helps us do.

"Most of us do not think in complete sentences but in self-interrupted, looping, impressionistic cacophony," she said. Writing helps us track our spinning thoughts and feelings, which can lead to key insights (e.g., I don't want to go to that party; I think I'm falling for this person; I'm no longer passionate about my job; I realize how I can solve that problem; I'm really scared about that situation.) Writing is "speaking to another consciousness – 'the reader' or another part of the self. We come to know who we really are in the present moment," she said. Writing also creates a mind-body-spirit connection, she said. "When you use your hands to pen or type something directly from your brain, you are creating a powerful connection between your inner experience and your body's movement out in the world." We hold worries, fears and memories in our bodies, Sullivan said. When we use the body in positive ways – such as dancing or writing — we stay in the present moment, we inhabit our bodies, and we can heal ourselves, she said. "Writing is a small movement but it is incredibly powerful when you are writing down what is in your mind."

Free writing or journaling is simply writing what's on your mind. It's letting it all hang out without censoring yourself. According to Sullivan, this could be: "Today I woke up and found the car window smashed and I wondered if the glass replacement guys go out at night and do it."

"Poetry is a natural medicine; it is like a homeopathic tincture derived from the stuff of life itself–your experience," writes John Fox in Poetic Medicine: The Healing Art of Poem-Making.

Sullivan suggested writing a short letter to a loved one. Imagine this person has written to you and asked you: "How are you doing, really?" Another exercise is to "write to someone with whom you have 'unfinished business' without sending it." The goal is for you to gain a clearer understanding of your own thoughts and feelings about the person, she said.
Answer the following questions:

1. Why does Julia Cameron believe that we all come into life as writers
2. What is the most important therapeutic quality of writing?
3. Whose consciousness does a writer touch through his or her writing?
4. How does Elizabeth Sullivan describe our thinking? Why does she say so?
5. Which word in the passage means ‘a coarse unpleasant noise’?

Part – B **15 marks**

2. Seminar Presentations on Life Skills topics:

Part – C **15 marks**

3. Viva Voce.

EC-311: SKILL UPGRADATION

Course Title	Skill Upgradation	Course Code	EC-311
Semester	III	Course Group	Core
Teaching Scheme in periods (L : T :P)	0:0:8	Credits	2.5
Methodology	Activities	Total Contact Periods	120
CIE	Rubrics	SEE	Nil

Rationale: This course is introduced for all semesters with a purpose of providing outside classroom experiences that lead to overall development of the students. One whole day is allocated for activities.

STUDENT ACTIVITY SHEET FOR SKILL UP GRADATION

The activity should be graded as

Excellent: 5 Marks, Good: 4 Marks, Satisfactory: 3 Marks, Needs improvement: 2 Marks, Unsatisfactory: 1 Mark

Note:

1. Along with every activity the rubrics table should be given to the student for his information about the criterion of assessment.
2. As a record of the activity at least Rubric sheet for each student For every activity at least Rubric sheet for each student as be preserved as a document.

EC-305

Suggested Student Activities

1. Participate in the Quiz
2. Participate in Group discussion
3. Search internet for more literature
4. Surprise test.

Suggested Model Rubrics				
CATEGORY	Needs improvement	Satisfactory	Good	Excellent
Organization of presentation	Hard to follow; sequence of information jumpy	Most of information presented in sequence	Information presented in logical sequence; easy to follow	Information presented as interesting story in logical, easy to follow sequence
Background content	Material not clearly related to topic OR background dominated seminar	Material sufficient for clear understanding but not clearly presented	Material sufficient for clear understanding AND effectively presented	Material sufficient for clear understanding AND exceptionally presented
Knowledge of subject	Does not have grasp of information; answered only rudimentary questions	At ease with information; answered most questions	At ease; answered all questions but failed to elaborate	Demonstrated full knowledge; answered all questions with elaboration
Eye Contact	Reads most slides; no or just occasional eye contact	Refers to slides to make points; occasional eye contact	Refers to slides to make points; eye contact majority of time	Refers to slides to make points; engaged with audience
Pace	Rushed OR dragging throughout	Rushed OR dragging in parts	Most of the seminar well paced	Well-paced throughout

RUBRICS MODEL – Group activity like Mini Project

RUBRICS FOR ACTIVITY (5 Marks)						
Dimension	Unsatisfactory	Developing	Satisfactory	Good	Excellent	Student Score
	1	2	3	4	5	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfill team's roles & Duties	Does not perform any duties assigned to the team role	Performs very little duties but Unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Life Skills

Suggested Student Activities:

- Listening Comprehension
- Seminars
- Presentations
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Find a solution to the problem
- Making innovative things through recycling
- Creating advertisements
- Five-minute activities on Life Skills
- Watching videos on life skills and making presentations
- Case studies
- Role Plays
- Dialogues

SKILL UPGRADATION ACTIVITIES

1. Visit the College library and prepare a list of at least 10 text books available in the library with author name and publishing company for each subject of the semester. The student should submit a handwritten report.
2. To Study about work benches and their connections, Different types of Power supplies, available in the Lab and prepare a detailed report of their working and uses. Documents have to be maintained as a record.
3. Do Market survey on List of digital ICs available in the market and collect the information like pin diagrams, specifications, Price etc. The student should submit a handwritten report. Documents have to be maintained as a record.
4. Analyze the connections in the UPS available in the Institution. Documents have to be maintained as a record.
5. Give Seminars on the topics of the concerned Course as allotted by the staff. Documents have to be maintained as a record.
6. Participate in Quiz in Concerned subjects. Documents have to be maintained as a record.
7. Write assignments in Concerned subjects. Documents have to be maintained as a record.
8. Prepare a power point presentation with full details about the electronic components used in the concerned subject experiments. Documents have to be maintained as a record.
9. Prepare a power point presentation with full details about the Digital ICs used in the concerned subject experiments. Documents have to be maintained as a record.
10. Visit YouTube or any other sites on current topics in Digital electronics experiments. Listen to the lectures and submit a handwritten report and a soft copy (CD/DVD).

11. Design a mini project useful to the society based on the topics relevant to electronic circuits and they have to be demonstrated. Student can search 5 min. /10 min. projects in you tube for this purpose
12. Design a mini project useful to the society based on the topics relevant to Digital electronics and they have to be demonstrated. Student can search 5 min. /10 min. projects in you tube for this purpose.