CURRICULUM – 2018

(C-18)

DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

TELANGANA, HYDERABAD

III SEMESTER

III SEMESTER

TEACHING AND EXAMINATION SCHEME

Sl No	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction Periods per week			Total Periods per semester	Credits	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	18EE-301F	Applied Engineering Mathematics	3	1	0	60	3	20	20	20	40	14	100	35
2	18EE-302C	Electrical Circuits	3	1	0	60	3	20	20	20	40	14	100	35
3	18EE -303C	DC Machines and Batteries	3	1	0	60	3	20	20	20	40	14	100	35
4	18EE -304C	Electrical and Electronic Measuring Instruments	3	1	0	60	3	20	20	20	40	14	100	35
5	18EE -305C	Electronic Circuits	3	1	0	60	3	20	20	20	40	14	100	35
6	18EE -306P	Circuits Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18EE -307P	DC Machines Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18EE -308P	Electrical Measurements Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18EE -309P	Electronics Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18EE 310P	Communication Skills and Life Skills	1	0	2	45	1.5	20	20	20	40	20	100	50
11		Skill Upgradation	0	0	7	105	2.5	0	0	Rubrics			--	-
			20	5	17	630	25	200	200	200	400	170	1000	425
	Activities: student performance is to be assessed through Rubrics													

APPLIED ENGINEERING MATHEMATICS

Course Title	**: Applied Engineering Mathematics**	Course Code	**: 18EE-301F**
Semester	**: III**	Course Group	**: Foundation**
Teaching Scheme in periods (L : T : P)	**: 45:15: 0**	Credits	**: 3**
Methodology	**: Lecture + Assignments**	Total Contact Periods	**: 60**
CIE	**: 60 Marks**	SEE	**: 40 Marks**
Programmes : **Common to all Engineering Diploma Programmes**			

Pre requisites

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

Course Outcomes

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

CO 1	Integrate different kinds of functions
CO 2	Integrate functions using different methods
CO 3	Find the values of definite integrals.
CO 4	Solve simple problems of Areas, Volumes, Mean and RMS values of various functions
CO 5	Find the Approximate values of Definite integrals using Trapezoidal and Simpson's 1/3rd rule
CO 6	Form the Differential Equation and Solve Simple DEs of 1st order and 1st degree.

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
1	Indefinite Integration-I	10	4	1	9(a)	13(a)
2	Indefinite Integration-II	8				
3	Definite Integral and its Properties	6		2	10(a)	14(a)
4	Applications of Definite	10				

	Integrals						
5	Numerical Integration	8		3	5,6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
6	Differential Equations Of First Order	18			7,8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
Total		60	8			8	8

Course Contents

Unit-I - Indefinite Integration-I **Duration: 10 Periods (L: 6.0 – T:4.0)**

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:

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

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

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

Unit – II - Indefinite Integration-II **Duration: 08 Periods (L: 4.8 – T:3.2)**

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

Unit-III - Definite Integral and its Properties **Duration: 06 Periods (L: 3.6 – T:2.4)**

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 - Applications of Definite Integrals **Duration: 10 Periods (L: 6 – T:4)**

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

Unit – V - Numerical Integration **Duration: 08 Periods (L: 4.8 – T:3.2)**

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 - Differential Equations Of First Order **Duration: 18 Periods (L: 10.8 – T:7.2)**

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.

Recommended Books

1. Integral Calculus Vol.I, by M.Pillai and Shanti Narayan
2. Thomas' Calculus, Pearson Addison –Wesley Publishers

Suggested E-learning references

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html

2.E-books:www.mathebook.net

Suggested learning outcomes

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

Unit-I

1.0 Use Indefinite Integration to solve engineering problems

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

1.2 State the indefinite integral of standard functions and properties of Integrals $\int (u + v)\, dx$ And $\int ku\, dx$ where k is constant and u, v are functions of x.

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

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

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

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

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 State the Bernoulli's rule for evaluating the integrals of the form $\int u.vdx$.
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 State the fundamental theorem of integral calculus
3.2 Explain the concept of definite integral.
3.3 Calculate the definite integral over an interval.
3.4 State various properties of definite integrals.
3.5 Evaluate simple problems on definite integrals using the above properties.
3.6 Explain 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.

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 Explain the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals andprovide some examples.

Unit –VI

6.0 Solve Differential Equations in engineering problems.

6.1 Define a Differential equation, 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 $dy/dx + Py = Q$, where P and Q are functions of x or constants.
v. Bernoulli's Equation (Reducible to linear form.)

6.4 Sol ve 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

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

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

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III semester Mid Semester-I Examination

Corse Code:18EE-301F **Duration:1 hour**
Course Name: Applied Engineering Mathematics **Max.Marks:20**

PART-A

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

1. Integrate: $e^x - \sin x + x^4$
2. Find : $\int \frac{dx}{5x+7}$ dx
3. Write Bernoulli's rule of integration
4. Find : $\int x \log x \, dx$

PART-B

Instructions: 1. Answer any **TWO** 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 : $\int \frac{dx}{(x^2+25)}$

6 a). Evaluate : $\int x \sin x dx$

Or

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

PART C

Instructions: 1. Answer any **TWO** 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 : $\int \cos x \cos 2x dx$.

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

Or

8 b) Find $\int x^4 Cos 2x dx$.

@@@

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III semester Mid Semester-II Examination

Corse Code: 18EE-301F **Duration:1 hour**
Course Name: Applied Engineering Mathematics **Max.Marks:20**

PART-A

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

1. Integrate : $\int_0^1 (x^4 + 1)\, dx$
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 any **TWO** questions 02 X 03 = 06
2. Each question carries **THREE** marks

Find the Mean value of the function y = logx on [1 , e]

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 any **TWO** 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 : $\int_0^{\frac{\pi}{2}} \log sinx dx$

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.

@@@

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Corse Code: 18EE-301F **Duration:2 hours**
Course Name: Applied Engineering Mathematics **Max.Marks:40 Marks**

PART-A

Instructions: 1. Answer **ALL** questions 08 X 01 = 08

2 Each question carries **ONE** mark

1. Integrate: $x^7 - 3/x$

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: $\frac{dy}{dx} = e^{2x+y}$

8. Write the condition for exactness of the differential equation M(x,y)dx + N(x,y)dy =0

PART-B

Instructions: 1. Answer any **FOUR** questions 04 X 03 = 12

2. Each question carries **THREE** marks

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

Or

9 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

10 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

11 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

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

PART C

Instructions: 1. Answer any **FOUR** questions 04 X 05 = 20

2. Each question carries **FIVE** marks

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

Or

13 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

14 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

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

Or

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

@@@

ELECTRICAL CIRCUITS

Course Title	**: Electrical Circuits**	Course Code	**: 18EE-302C**
Semester	**: III**	Course Group	**: Core**
Teaching Scheme in periods (L : T : P)	**: 45 : 15 : 0**	Credits	**: 3**
Methodology	**: Lecture + Tutorial**	Total Contact Periods	**: 60**
CIE	**: 60 Marks**	SEE	**: 40 Marks**

Pre requisites

This course requires the knowledge of basic electrical engineering.

Course Outcomes

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

CO 1	Apply Kirchhoff's laws and star delta transformations to complex circuits
CO 2	Apply network theorems to solve DC circuits
CO 3	Familiarize the fundamentals of alternating quantities
CO 4	Solve problems on single phase A.C. series circuits
CO 5	Solve problems on single phase A.C. parallel circuits
CO 6	Solve problems on poly phase balanced circuits

Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Kirchhoff’s Laws and Star - Delta Transformation</td><td>8</td><td rowspan="6">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td></tr>
<tr><td>2</td><td>Network Theorems</td><td>12</td></tr>
<tr><td>3</td><td>Fundamentals of A.C</td><td>8</td><td colspan="2" rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td></tr>
<tr><td>4</td><td>Single phase A.C. Series Circuits</td><td>12</td></tr>
<tr><td>5</td><td>Single phase A.C. Parallel Circuits</td><td>10</td><td rowspan="2">3</td><td>5,6</td><td>9(b), 11(a), 11(b)</td><td>13(b), 15(a), 15(b)</td></tr>
<tr><td>6</td><td>Poly Phase Circuits</td><td>10</td><td>7,8</td><td>10(b), 12(a), 12(b)</td><td>14(b), 16(a), 16(b)</td></tr>
<tr><td colspan="2">Total</td><td>60</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT 1 - Kirchhoff’s Laws and Star - Delta Transformation Duration: 8 Periods (L: 6 - T: 2)

Active and Passive circuits - Junction, branch and loop in circuits -Insufficiency of Ohm’s law to solve complex circuits, Kirchhoff’s laws – Mesh analysis – Nodal analysis - Star - Delta configurations, star-delta transformations.

UNIT 2– Network Theorems Duration: 12 Periods (L: 9 – T: 3)

Ideal Voltage source, Ideal current source- Source transformation technique-Superposition theorem-Thevenin’s Theorem -Norton’s Theorem- Maximum power transfer theorem with reference to D.C.-Problems on the above.

UNIT 3 – Fundamentals of A.C Duration: 8 Periods (L: 6 – T: 2)

Definition of Alternating quantity, cycle, time period, frequency, amplitude, instantaneous value and angular velocity - Average value - effective value/R.M.S value – form factor – peak factor - definitions and derivations - calculations of these values for sine wave, half wave rectified sine wave, full wave rectified sine wave, triangular and square wave forms - Representation of alternating quantities by equation, graphs and phasor diagrams - Phase and phase difference–Understanding of `j’ notation for alternating quantities ,transformation from polar to rectangular notations and vice-versa.

UNIT 4 - Single phase A.C. Series Circuits **Duration: 12 Period (L: 9 – T: 3)**

Resistance, inductance and capacitance as circuit elements - concept of reactance, Derive the expression forvoltage, current, impedance, power including waveforms and phasor diagrams in pure resistive, inductive and capacitive circuits - Derive the impedance, current, phase angle, power and power factor in R-L, R-C, L-C &R-L-C series circuits including phasor diagrams. Impedance triangle, phase angle, power factor, active and reactive components of power in above circuits – Definition of Resonance in series circuits and expression for resonant frequency-Q-factor-Importance of Q- factor- Problems on series circuits and series resonance.

UNIT 5 - Single phase A.C. Parallel Circuits **Duration: 10 Periods (L:7.5 – T: 2.5)**

Derive the impedance, current, phase angle, power and power factor in R-L, R-C, LC &R-L-C parallel circuits including phasor diagrams. Impedance triangle, phase angle, power factor, active and reactive components of current and power in above circuits – Solve simple problems on parallel circuits by vector method and by `j' notation –Parallel RLC resonance circuit –Condition for resonance in parallel circuit- Q-factor and resonance frequency-problems

UNIT 6 - Poly phase circuits **Duration: 10 Periods (L:7.5 – T: 2.5)**

Definition of Poly phase - Generation of 2 phase and 3 phase EMF's - Representation of 2 phase and 3 phase EMF's by equations, waveforms and phasors - phase sequence - Current in neutral in 2 phase and 3 phase system - phasor diagram showing relation between phase and line quantities, Relation between phase and Line values of voltages and currents – 3 phase power equation - Problems on 3 phase balanced circuits –Advantages of poly-phase systems over single-phase systems.

Recommended Books

1. Electrical Technology - Vol - I by B.L. Theraja- S.Chand &co.
2. Introduction to Electrical Engg. by V.K.Mehta
3. Electrical Technology by Hughes.
4. Problems in Electrical Engg. by Parker Smith
5. Engineering Circuit analysis by William Hayt and Jack E,kemmerly-TMH
6. Electrical Circuits by A.Chakraborthy- Dhanapat Rai and Sons
7. Network and Systems by D. Roy Chowdary- New age international publishers
8. Electric Circuit Theory by K. Rajeshwaran-Pearson educations,2004
9. Network Analysis by Van Valkenburg, PHI.
10. Electrical Circuits by Joseph Edminister- Schaum series
11. Fundamentals of Electric circuits – Alexander Sadiku- TMH
12. Electric circuits by Mahmood Nahvi, Joseph A Edminister-TMH.

Suggested E-learning references

1. http://electrical4u.com/

2. www.nptel.ac.in

3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/

4. Fundamentals Handbook of Electrical Science, Module 1, Basic Electrical Theory, Department of Energy, U. S. Department of Energy, June 1992.

5.http://www.freeengineeringbooks.com/electrical-books-download/Electrical-Engineering-basics.php
6. https://electrical-engineering-portal.com/theorems-network-reductions#circuit-theorems
7. https://nptel.ac.in/courses/108102042/
8. https://nptel.ac.in/courses/108108076/

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

1.1 Differentiate between active and passive circuits.
1.2 Define junction in circuits
1.3 Define loop in circuits
1.4 Define branch in circuits
1.5 State the limitations of Ohm's law.
1.6 State Kirchhoff's current law
1.7 State Kirchoff's voltage law.
1.8 Solve problems by applying KVL and KCL
1.9 Explain mesh analysis
1.10 Explain nodal analysis
1.11 Solve simple problems on mesh analysis and nodal analysis
1.12 Explain star and delta circuits
1.13 Explain the concept of circuit transformation and equivalent circuits
1.14 Develop transformation formulae for star- delta transformations
1.15 Solve problems on star delta transformation

2.1 Define ideal voltage source
2.2 Define ideal current source
2.3 Explain source transformation technique
2.4 Solve simple problems on source transformation
2.5 State Superposition theorem.
2.6 State Thevenin's theorem.
2.7 State Norton's theorem
2.8 State maximum power transfer theorem.
(All the theorems with reference to D.C only)
2.9 Derive the condition for maximum power transfer
2.10 Solve simple problems on network theorems

3.1 Define alternating quantity
3.2 Define cycle of an alternating quantity
3.3 Define frequency of an alternating quantity
3.4 Define time period of an alternating quantity
3.5 Define amplitude of an alternating quantity
3.6 Define angular velocity of an alternating quantity
3.7 Define the instantaneous value of an alternating quantity
3.8 Define maximum value of an alternating quantity
3.9 Define average value of an alternating quantity
3.10 Define R.M.S value of an alternating quantity
3.11 Define form factor of an alternating quantity
3.12 Define peak factor of an alternating quantity
3.13 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of sine wave
3.14 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of half wave rectified sine wave

3.15 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of full wave rectified sine wave
3.16 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of triangular wave
3.17 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of square wave
3.18 Define the terms phase and phase difference (No problems).
3.19 Define j operator.
3.20 Convert polar quantities to rectangular quantities and vice-versa.

4.1 Define the terms resistance, inductance and capacitance
4.2 Define reactance
4.3 Define active power, reactive power and apparent power
4.4 Mention the units of active power, reactive power and apparent power
4.5 Draw current, voltage waveforms, phasor diagram of pure resistive circuit
4.6 Derive the expression for voltage, current, impedance, power in pure resistive circuit
4.7 Draw current, voltage waveforms, phasor diagram of pure inductive circuit
4.8 Derive the expression for voltage, current, impedance, power in pure inductive circuit
4.9 Draw current, voltage waveforms, phasor diagram of pure capacitive circuit
4.10 Derive the expression for voltage, current, impedance, power in pure capacitive circuit
4.11 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-L series circuit
4.12 Derive the expression for voltage, current, impedance, power and power factor in R-L series circuit
4.13 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-C series circuit
4.14 Derive the expression for voltage, current, impedance, power and power factor in R-C series circuit
4.15 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of L-C series circuit
4.16 Derive the expression for voltage, current, impedance, power and power factor in L-C series circuit
4.17 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-L-C series circuit
4.18 Derive the expression for voltage, current, impedance, power and power factor in R-L-C series circuit
4.19 Compute apparent power, active power and reactive of series circuits
4.20 Solve simple problems on R-L, R-C, L-C, R-L-C series circuits
4.21 Define resonance in series circuits
4.22 State the condition for resonance in series circuit
4.23 Derive resonant frequency of single phase series RLC circuit.
4.24 Solve simple problems on series resonance
4.25 Define Q- factor of single phase series RLC circuit
4.26 State the importance of Q-factor.
4.27 Derive the expression for Q-factor of single phase series RLC circuit
4.28 Solve simple problems on Q-factor

5.1 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-L parallel circuit
5.2 Derive the expression for voltage, current, impedance, power and power factor in R-L parallel circuit
5.3 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-C parallel circuit
5.4 Derive the expression for voltage, current, impedance, power and power factor in R-C parallel circuit
5.5 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of L-C parallel circuit
5.6 Derive the expression for voltage, current, impedance, power and power factor in L-C parallel circuit
5.7 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-L-C parallel circuit
5.8 Derive the expression for voltage, current, impedance, power and power factor in R-L-C parallel circuit

5.9 Compute apparent power, active power and reactive of parallel circuits
5.10 Solve simple problems on R-L, R-C, L-C, R-L-C parallel circuits
5.11 Solve simple problems on parallel circuits by vector method
5.12 Solve simple problems on parallel circuits by j- notation method
5.13 Define resonance in parallel circuits
5.14 State the condition for resonance in parallel circuit
5.15 Derive resonant frequency of single phase parallel RLC circuit.
5.16 Solve simple problems on parallel resonance
5.17 Define Q- factor of single phase parallel RLC circuit
5.18 Derive the expression for Q-factor of single phase parallel RLC circuit
5.19 Solve simple problems on Q-factor

6.1 Define the term `Poly Phase'.
6.2 Explain the method of generation of 2 phase emfs
6.3 Explain the method of generation of 3 phase emfs.
6.4 Write the expressions for Poly phase emfs
6.5 Represent poly phase emfs by phasor diagram
6.6 Represent poly phase emfs by waveforms
6.7 Define phase sequence
6.8 Compute the current flowing neutral conductor in 2-phase system
6.9 Compute the current flowing neutral conductor in 3-phase system
6.10 Derive the relation between line and phase values of current and voltage in 3 phase star circuit
6.11 Derive the relation between line and phase values of current and voltage in 3 phase delta circuits.
6.12 Derive the equation for power in 3 phase circuit.
6.13 Solve simple problems in three-phase system with balanced loads.
6.14 List the advantages of 3 phase system over single phase system.

Suggested Student Activities

1. Prepare a chart on various electrical circuit theorems and their practical applications.
2. Write a report on practical applications of Single phase AC circuits and Three phase AC circuits with their operating voltages and other electrical parameters.
3. Visit nearby Industry to familiarize with single phase and poly phase circuits
4. Quiz
5. Group discussion
6. Surprise test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	3		1						3	1,2,4,10
CO2	3	3		1						3	1, 2,4,10
CO3	3	3		1						3	1,2,4,10
CO4	3	3		1						3	1,2,4,10
CO5	3	3		1						3	1,2,4,10
CO6	3	3		1						3	1,2,4,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

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

State Board of Technical Education and Training,Telangana

Model Question paper
DEEE III semester Mid Semester-I Examination

Corse Code:18EE-302C **Duration:1 hour**
Course Name: Electrical Circuits **Max.Marks:20**

PART-A

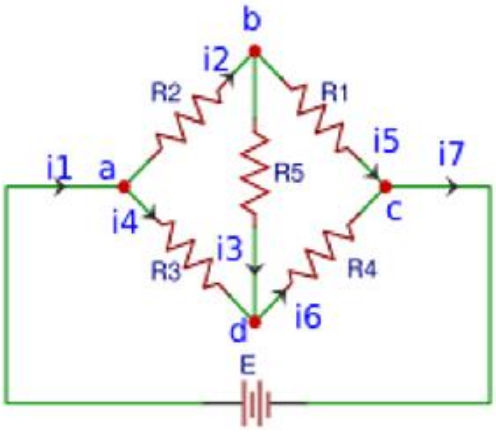
Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1) State Kirchhoff's current law.
2) Define junction of an electrical network
3) What is an ideal voltage source?
4) State Thevenin's theorem.

PART-B

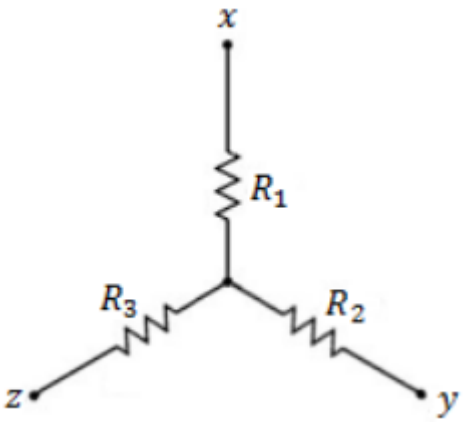
Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5) a) Find the magnitude and direction of the unknown currents in below circuit. Given i1 = 10A, i2 = 6A and i5 = 4A.



OR

b) Convert the below star network to an equivalent delta network if $R_1=R_2=R_3=2\Omega$.



6) a) State how to convert a voltage source to current source with an example.

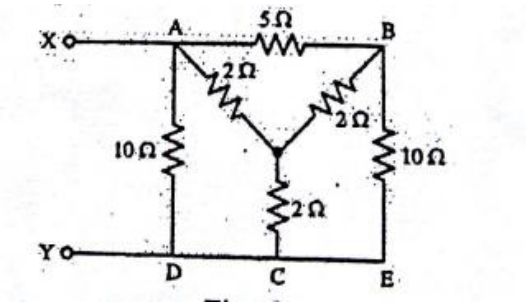
OR

b) State superposition theorem.

PART-C

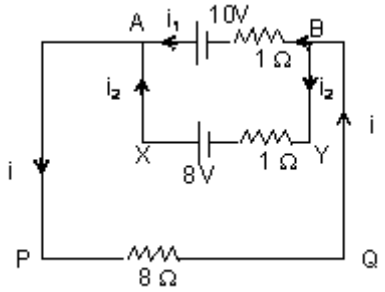
Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7) a) Find the equivalent resistance between X and Y for the circuit shown below

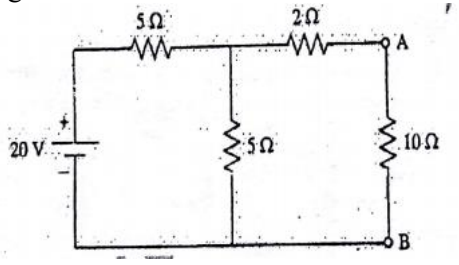


OR

b) Find the current through 8Ω resistor for the network shown below by using Kirchhoff's law.

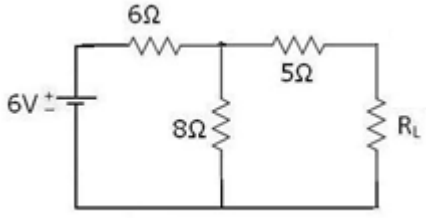


8) a) Determine the current through 10Ω resistor of the network shown below by using Norton theorem.



OR

b) Find the value of R_L for the given network below so that the power drawn by R_L is maximum.



State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III semester Mid Semester-II Examination

Corse Code:18EE-302C **Duration:1 hour**
Course Name: Electrical Circuits **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1) Define form factor
2) Convert 3+j4 to polar quantity.
3) Draw the power triangle of single phase series RC circuit .
4) Draw the phasor diagram of pure inductor.

PART-B

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5) a) Give the expression of rms value and average value of half wave rectified sine wave.

OR

b) Define the phase and phase difference of alternating quantities.

6) a) Give the expressions of impedance and power factor of single phase series RL circuit.

OR

b) Give the expressions of Q-factor and resonant frequency of single phase series circuit.

PART-C

Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7) a) Derive the expression for RMS value and average value of full wave rectified sine wave.

OR

b) Derive the expression for peak factor and form factor of a square wave.

8) a) Derive the expression for resonant frequency of a series RLC circuit.

OR

b) A coil having resistance of 7Ω and inductance of 30 mH is connected to 230V, 50 Hz single phase supply. Calculate the circuit current and power factor.

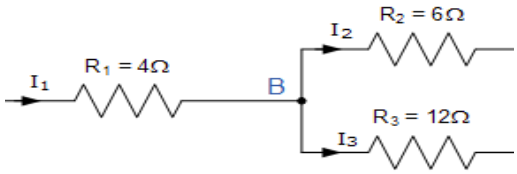
State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Corse Code:18EE-302C **Duration:2 hours**
Course Name: Electrical Circuits **Max.Marks:40Marks**

PART-A

Answer **all** questions **8x1 =8 Marks**

1) Find the current I_2 in the below circuit given I_1= 10 A and I_3 = 7A.

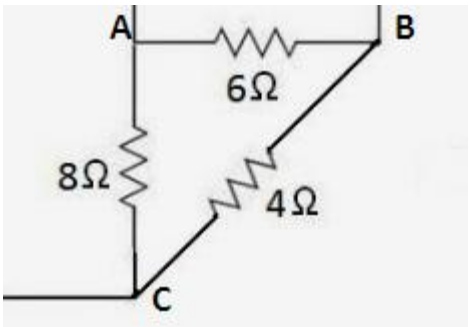


2) Define a) Average value and b) RMS value.
3) Write the voltage and current relationships in a three phase circuits for a star connected balanced load.
4) What is the current through a capacitor C= 10nF connected to a single phase 50V, 50Hz voltage source?
5) Define Q-factor.
6) State the condition for resonance in parallel circuits.
7) Define the term polyphase.
8) State any two advantages of 3 phase system over single phase system.

PART-B

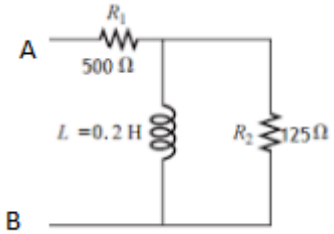
Answer **four** questions **4 x 3 = 12 Marks**

9) a) Transform the given delta network to star.



OR

b) Find the impedance between A and B in the below circuit when it is energized by v(t) = 100sin314t Volts.



10 a) Determine the average value, RMS value and form factor of single phase AC 230 V, 50Hz full wave rectified sine wave.

OR

b) Write the expressions for Poly phase emfs and represent them by phasor diagram.

11. a) Derive the resonant frequency of single phase parallel RLC circuit.

OR

b) Give the expression for impedance and current of single phase parallel RLC circuit.

12. a) Calculate the power in 3 phase balanced resistive circuit connected to 3 phase 440V, 50Hz carrying line current of 0.5A.

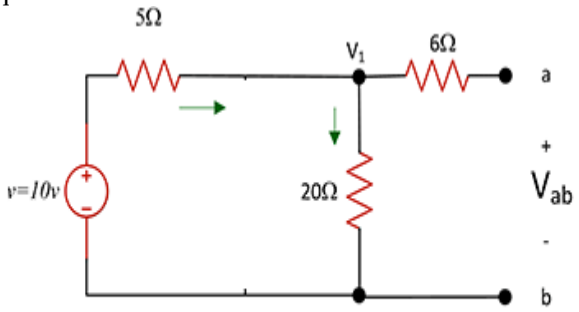
OR

b) Write the expression for power in balanced three phase star circuit and delta circuit.

PART - C

Instructions: (1) Answer the following questions
(2) Each question carries **five** marks. **Marks: 4 X 5 = 20**

13. a) Find the Thevenins equivalent of the circuit shown below:



OR

b) Derive an expression for resonant frequency of a parallel RLC circuit.

14. a) A current of 10A flows through a non-inductive resistance in series with a coil when supplied at 250V, 50Hz. If the voltage across the resistance is 250V and across the coil is 400V, calculate a) impedance of the coil and b) total power consumed by the circuit.

OR

b) Explain how to generate the 3 phase emf's with neat figures.

15. a) A parallel RLC circuit with a 16 Ω resistance, 8 Ω inductive reactance, and 20 Ω capacitive reactance is supplied by a 120-V power supply. What are the values of currents through R, L and C, total line current and active power?

OR

b) A parallel RC circuit has a power supply of 100 V, 60 Hz. A current of 10A flows through the resistor and a current of 10A flows through the capacitor. Calculate the values of line current, true power, reactive power, apparent power and power factor?

16. a) Three identical impedances are connected in delta to a 3-phase 400 V, 50Hz supply. The line current is 34.65 A and the total power taken from the supply is 14.4 kW. Calculate the resistance and reactance values of each impedance.

OR

b) Three coils each having a resistance of 20Ω and inductive reactance of 15Ω are connected in star to a 3-phase, 400V, 50Hz supply. Calculate a) line current, and b) power consumed.

DC MACHINES & BATTERIES

Course Title	**: DC Machines & Batteries**	Course Code	**: 18EE-303C**
Semester	**: III**	Course Group	**: Core**
Teaching Scheme in periods (L : T : P)	**: 45 : 15 : 0**	Credits	**: 3**
Methodology	**: Lecture + Tutorial**	Total Contact Periods	**: 60**
CIE	**: 60 Marks**	SEE	**: 40 Marks**

Pre requisites

This course requires the knowledge of basic principles of electricity and magnetism.

Course Outcomes

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

CO 1	Describe the construction and working of D.C Generator
CO 2	Compare the performance characteristics of D.C Generators
CO 3	Explain the principle and performance of D.C Motors
CO 4	Compare the performance characteristics of D.C Motors
CO 5	Apply different methods to control the speed of D.C Motor
CO 6	Compare different types of batteries

Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="3">R</th><th>U</th><th>A</th></tr>
<tr><td>1</td><td>Fundamentals of D.C Generators</td><td>12</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>2</td><td>Armature Reaction and Characteristics of D.C Generator</td><td>08</td></tr>
<tr><td>3</td><td>Fundamentals of D.C Motors</td><td>12</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>4</td><td>Starters, Characteristics and Applications of D.C Motors</td><td>08</td></tr>
<tr><td>5</td><td>Speed control and Testing of D.C Motors</td><td>08</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b), Q11(a), Q11(b)</td><td>Q13(b), Q15(a), Q15(b)</td></tr>
<tr><td>6</td><td>Batteries</td><td>12</td><td>Q7,Q8</td><td>Q10(b), Q12(a), Q12(b)</td><td>Q14(b), Q16(a), Q16(b)</td></tr>
<tr><td colspan="2">Total</td><td>60</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT 1- Fundamentals of D.C Generators **Duration: 12 Periods (L: 9 - T: 3)**

Dynamically induced E.M.F- Fleming's right hand rule - electromechanical energy conversion - simple loop generator -working principle of D.C generator - construction- functions of each part of D.C generator with neat sketches- windings - (i) Lap (ii) Wave – Compare Lap and wave windings-Classification of generators based on excitation- Voltage and Current equations for different types of D.C Generators with schematic diagrams- E.M.F equation – power stage diagram of DC generator - losses incurred in the D.C machines- efficiency –condition for maximum efficiency - simple problems

UNIT 2 - Armature Reaction and Characteristics of D.C Generator Duration : 08 Periods (L:6 - T: 2)

Armature reaction, Demagnetization & Cross magnetization-Derive for ATd, ATc / Pole- simple problems- commutation –methods of improving commutation- O.C.C, internal, external characteristics of Separately excited, Shunt, Series and Compound generators- Conditions for (i) Building up (ii) Non building up of E.M.F.- Critical field resistance and critical speed from O.C.C - parallel operation of generators - Applications of D.C generators – Welding Generator.

UNIT 3– Fundamentals of D.C Motors **Duration: 12 Periods (L:9 - T:3)**

Fleming's left hand rule - working of D.C motors – classification of DC motors- significance of back E.M.F. Write the formulas for back E.M.F for different D.C motors-Problems on E.M.F equation-Torque equation-Armature torque (Ta) , shaft torque (Tsh) and loss torque(TL)–Problems on Torque- Different losses-power stages-efficiency-Problems on losses and efficiency.

UNIT4 : Starters, Characteristics and Applications of D.C Motors **Duration: 08 Periods (L:6– T: 2)**

Necessity of starter- 3-point starter, 4-point starter. Electrical and mechanical characteristics of D.C Shunt, Series and compound motors-Applications of D.C motors

UNIT 5 :Speed control and Testing of D.C Motors **Duration: 08Periods (L:6 – T:2)**

Necessity of speed control- different methods (Flux, Armature and Voltage) of speed controls for D.C shunt motors-State the advantages and disadvantages of above methods-different methods of speed control for series motors- problems. Performance curves- Brake test on different types of D.C. Motors- Swinburne's Test-advantages and disadvantages- problems.

UNIT 6 : Batteries **Duration: 12 Periods (L:9 T:3)**

Classification of cells - primary cells and secondary cells - construction of Lead acid cell - chemical reaction during charging and discharging of lead acid cell - applications - charging of Batteries – precautions during charging and discharging - trickle charging - indications of full charged battery - capacity of a battery - factors affecting the capacity of the battery - Ampere-Hour efficiency - Watt- Hour efficiency - problems - flat plate battery - tubular battery - applications - construction of Lithium-ion cell- chemical reaction during charging and discharging - applications - super capacitor - applications - metal air electrochemical cell - refuelable battery - applications - maintenance free battery – applications - methods of disposing batteries.

Recommended Books

1. Electrical Technology –Vol –I by B.L.Theraja.
2. Electrical Technology –Vol –II by B.L.Theraja.
3. Electrical Machines by P.S.Bhimbhra
4. Electrical Machines by M.V.Deshpande
5. Electrical Machines by JB Gupta

Suggested E-learning references

1. http://electrical4u.com/
2. https://nptel.ac.in/syllabus/108106070/
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
4. https://nptel.ac.in/courses/108108076/
5. https://nptel.ac.in/courses/108105053/

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

1.1 Define dynamically induced E.M.F.

1.2 State Fleming's right hand rule.

1.3 Define Electromechanical energy conversion.

1.4 Explain the working of simple loop generator.

1.5 State principle of working of D.C generator.

1.6 Describe the construction of DC generator

1.7 State the functions of each part of D.C generator with neat sketches.

1.8 Describe the working of D.C Generator.

1.9 List the types of windings of D.C Machine — (i) Lap (ii) Wave.

1.10 Compare lap winding and wave winding

1.11 Classify generators based on excitation.

1.12 Write voltage and current equations for different types of D.C Generators with schematic diagrams.

1.13 Derive the E.M.F equation of D.C generator.

1.14 Solve simple problems on E.M.F equation.

1.15 Explain power stages in D.C. machine

1.16 List the losses incurred in the D.C machines.

1.17 Define efficiency of DC Generator

1.18 Derive the condition for maximum efficiency.

1.19 Solve problems on losses and efficiency .

2.1 Define armature reaction.

2.2 Describe the armature reaction with sketches.

2.3 Describe the phenomenon of demagnetization & cross magnetization.

2.4 Derive the formula for ATd , ATc / Pole.

2.5 Solve simple problems on ATd , ATc / Pole .

2.6 Define Commutation.

2.7 List the methods to improve commutation.

2.8 Draw and explain O.C.C, internal and external characteristics of Separately excited generator

2.9 Draw and explain O.C.C, internal and external characteristics of Shunt generator.

2.10 Draw and explain O.C.C, internal and external characteristics of Series generator

2.11 Draw and explain O.C.C, internal and external characteristics of Compound generators.

2.12 List the conditions for (i) Building up (ii) Non building up of E.M.F in DC generators.

2.13 Define critical field resistance and critical speed from O.C.C

2.14 Explain the necessity of parallel operation of DC generators.

2.15 List the conditions for parallel operation of generators. (No - Problems)

2.16 State the use of equalizer ring in parallel operation.

2.17 List the applications of D.C generators.

2.18 Describe the working of welding generator with a sketch.

3.1 State Fleming's left hand rule.

3.2 Describe the working of D.C motors

3.3 Classify D.C motors.

3.4 Write the significance of back E.M.F and its formula.

3.5 Write the formulas for back E.M.F for different D.C motors.

3.6 Solve problems on E.M.F equation.

3.7 Derive torque equation of D.C motor.

3.8 Develop the formulas for armature torque (T_a), shaft torque (T_{sh}) and loss torque(T_L).

3.9 Solve problems on torque.

3.10 Explain power stages in D.C. motor.

3.11 List the different losses in D.C motor.

3.12 Define efficiency of D.C motor

3.13 Solve problems on losses and efficiency.

4.1 State the necessity of starter.

4.2 Describe the construction and working of 3-point starter with neat sketch.

4.3 Describe the construction and working of 4-point starter with neat sketch.

4.4 Draw and explain the electrical characteristics of D.C Shunt motor.

4.5 Draw and explain the mechanical characteristics of D.C Shunt motor

4.6 Draw and explain the electrical characteristics of D.C Series motor.

4.7 Draw and explain the mechanical characteristics of D.C Series motor

4.8 Draw and explain the electrical characteristics of D.C compound motor.

4.9 Draw and explain the mechanical characteristics of D.C compound motor

4.10 List the applications of D.C motors

5.1 State the need of speed control of DC Motors.

5.2 List the different methods of speed controls for D.C shunt motors.

5.3 Describe the speed control of D.C shunt motor by flux control method

5.4 Describe the speed control of D.C shunt motor by armature control method

5.5 Describe the speed control of D.C shunt motor by voltage control method

5.6 List the advantages and disadvantages of various speed control methods of D.C Shunt Motor.

5.7 Solve problems on speed control of DC shunt motor

5.8 List the different methods of speed control for D.C series motors.

5.9 Describe the speed control methods of D.C series motor.

5.10 List the advantages and disadvantages of speed control methods of D.C series motor.

5.11 Solve problems on speed control of DC series motor

5.12 State and explain the different performance curves.

5.13 Describe the method of conducting brake test on D.C shunt motor with neat sketch

5.14 Describe the method of conducting brake test on D.C series motor with neat sketch

5.15 Describe the method of conducting brake test on D.C compound motor with neat sketch

5.16 List the advantages and disadvantages of brake test on different types of D.C Motors.

5.17 Solve problems on brake test on different types of D.C Motors.

5.18 Describe the method of conducting Swinburne's test.

5.19 Solve problems on Swinburne's test

5.19 List the advantages and disadvantages of Swinburne's test.

6.1 Classify cells

6.2 Define primary cells and secondary cells

6.3 Compare primary and secondary cells

6.4 Name types of storage cells

6.5 Describe the construction of Lead acid cell.

6.6 Write chemical reaction during charging and discharging of lead acid cell

6.7 List the applications of Lead acid cell

6.8 Describe charging of Batteries by a) Constant current method b) Constant voltage method

6.9 List the precautions during charging and discharging.

6.10 Define trickle charging

6.11 List the indications of full charged battery.

6.12 Define capacity of a battery

6.13 List the factors affecting the capacity of the battery

6.14 Define efficiency of a battery : a) Ampere-Hour efficiency b) Watt- Hour efficiency

6.15 Solve problems on the Ampere-Hour efficiency and Watt-Hour efficiency

6.16 Compare flat plate and tubular battery

6.17 List the applications of flat plate battery

6.18 List the applications of tubular battery

6.19 Describe the construction of Lithium-ion cell.

6.20 Write chemical reaction during charging and discharging of Lithium-ion battery

6.21 Give the applications of Lithium-ion cell

6.22 State the importance of super capacitor

6.23 List the applications of super capacitor

6.24 Describe the working of metal air electrochemical cell

6.25 List the applications of metal air battery

6.26 State the importance of refuelable battery

6.27 List the applications of refuelable battery

6.28 Define maintenance free battery

6.29 List the applications of maintenance free batteries

6.30 List different methods of disposing batteries.

Suggested Student Activities

1. Prepare charts on types of starters used for various DC motors clearly labeling the parts.
2. Visit nearby shop or show room which sells batteries and inverters (UPS) and prepare a report on the observations made during visit.
3. Identify a faulty battery and service the same using standard tools.
4. Prepare a report of the conditions of batteries available in the Institute.
5. For given voltage, current, Ah ratings of individual cell, and required voltage and current rating of battery, prepare a report of calculations for number of cells and their method of connections.
6. Visit any industry and write a report on the DC machines used in that industry
7. Prepare a chart on DC motor speed control techniques
8. Make charts of various types of DC motors and generators electrical equivalent circuit diagrams clearly indicating voltages and currents flowing in the machine. Also write the formulae of armature current, field current, line or load current, terminal voltage and back emf or induced emf
9. Quiz
10. Group discussion
11. Surprise test.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	3		1						3	1,2,4,10
CO2	3	3		1						3	1, 2,4,10
CO3	3	3		1						3	1,2,4,10
CO4	3	3								3	1,2,10
CO5	3	3		1						3	1, 2,4,10
CO6	3	3		1		2	2			3	1,2,4,6,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

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

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III semester Mid Semester-I Examination

Corse Code:18EE-303C **Duration:1 hour**
Course Name: DC Machines & Batteries **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1. Write the condition for maximum efficiency.
2. State the function of yoke in a DC generator
3. List the different effects of armature reaction in a DC machine?
4. Draw the O.C.C of a self excited DC generator.

PART-B

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5 a) Draw the power flow diagram of a DC generator.

OR

b) Compare lap winding and wave winding in any three aspects.

6. a) List the conditions to be satisfied for parallel operation of dc generators?

OR

b) Define commutation and list the methods to improve it.

PART-C

Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7. a) A long shunt compound generator delivers a load current of 400A at a terminal voltage of 250V. The armature resistance, series field and shunt field resistances are 0.04 ohm, 0.01 ohm and 125 ohms respectively. Calculate the generated emf and armature current. Allow 1 V per brush contact drop.

OR

b) Derive the EMF equation of a DC Generator.

8. a) Derive the equation for demagnetizing ampere turns per pole

OR

b) Describe the working of welding generator.

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III semester Mid Semester-II Examination

Corse Code:18EE-303C **Duration:1 hour**
Course Name: DC Machines & Batteries **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1) Draw the connection diagram of a D.C shunt motor
2) Define armature torque
3) Draw the torque Vs armature current characteristics for a D.C shunt motor.
4) List any two application of D.C shunt motor

PART-B

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5. a) Write the significance of back E.M.F and its formula

OR

b) State Fleming's Left hand rule

6 a) Why starter is required for starting a D.C Motor

OR

b) State the function of Hold on coil and over load release of a 3 point starter.

PART-C

Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7 a) Derive the torque equation of a D.C Motor

OR

b) A 440 V shunt motor has armature resistance of 0.8 ohm and field resistance of 200 ohms. Determine the back e.m.f when giving an output of 7.46 KW at 85% efficiency.

8. a) Draw 3 point starter and label the parts.

OR

b) Draw and explain the mechanical characteristics of D.C series motor.

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Corse Code:18EE-303C **Duration:2 hours**
Course Name: DC Machines & Batteries **Max.Marks:40Marks**

PART-A

Answer **all** questions 8**x1 =8 Marks**

1) Define armature reaction.
2) Draw the electrical characteristics of a DC series motor.
3) Mention the speed control method of a DC shunt motor which gives speed above normal speed
4) Write the voltage equation of a Dc shunt generator.
5) List the factors on which the speed of DC motor depends.
6) List any one advantage of speed control of DC motor by flux control method.
7) List any two applications of lead acid battery.
8) List the methods of battery charging.

PART-B

Answer **four** questions **4 x 3 = 12 Marks**

9. a) Classify d.c generators based on excitation.

OR

b) Draw the performance curves of DC series motor.

10.a) Why starter is required for starting a Dc motor.

OR

b) Define trickle charging

11. a) List the speed control methods of DC shunt motor.

OR

b) Mention any three advantages of Brake test on DC shunt motor.

12. a) Compare Primary cells and secondary cells in any three aspects.

OR

b) List the indications of fully charged battery.

PART-C

Answer **four** questions 4 **x 5 = 20 Marks**

13. a) A 10KW, 250 V Dc shunt generator has total iron and friction losses of 600W. Its armature and shunt field resistances are 0.5Ω and 125Ω respectively. Calculate efficiency at rated load.

OR

b) Explain the speed control of Dc series motor by field diverter.

14. a) Describe the working of D.C motor

OR

b) List any five applications of Lithium ion battery.

15. a) Describe Brake test on a Dc shunt motor with a neat sketch.

OR

b) A 500 V Dc shunt motor runs at its normal speed of 250 rpm when the armature current is 200A. The resistance of armature is 0.12Ω. Calculate the speed when a resistance is inserted in the field reducing the shunt field to 80% of normal value and the armature current is 100A.

16.a) Explain the charging of a battery by constant voltage method.

OR

b) A lead acid cell is discharged of steady current of 5A for 11 hours. The average terminal voltage being 1.8 V. To restore it to its original state of charge a current of 3A for 30 hours is required, the average terminal voltage being 2.2V. Calculate the ampere hour efficiency(AH) and watt hour efficiency(WH).

ELECTRICAL AND ELECTRONIC MEASURING INSTRUMENTS

Course Title	**: Electrical and Electronic Measuring Instruments**	Course Code	**: 18EE-304C**
Semester	**: III**	Course Group	**: Core**
Teaching Scheme in periods (L : T : P)	**: 45 : 15 : 0**	Credits	**: 3**
Methodology	**: Lecture + Tutorial**	Total Contact Periods	**: 60**
CIE	**: 60 Marks**	SEE	**: 40 Marks**

Pre requisites

This course requires the knowledge of basic principles of electricity and simple mechanical terms.

Course Outcomes

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

CO 1	Classify measuring instruments
CO 2	Select suitable meter depending on the type of application
CO 3	Measure various electrical parameters using electromechanical measuring instruments
CO 4	Measure R, L, C parameters
CO 5	Describe various transducers and sensors
CO 6	Compare various electronic and digital instruments

BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Basics of Measuring Instruments	8	4	1		9(a)	13(a)
2	Voltage and Current Measuring Instruments	12					
3	Power and Energy Measuring Instruments	12		2		10(a)	14(a)
4	Measurement of Basic Circuit Elements	08					
5	Transducers and Sensors	10		3	5,6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
6	Electronic & Digital Instruments	10			7,8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
Total		60	8			8	8

Course Contents

UNIT 1 - Basics of Measuring Instruments **Duration: 8 Periods (L:6 - T: 2)**

Definitions of accuracy, precision, error, resolution and sensitivity - important electrical quantities to be measured - their units -names of instruments to measure them - classification of instruments -different types of torques (deflection, controlling and damping torques) in the indicating instruments - types of errors.

UNIT 2 – Voltage and Current Measuring Instruments **Duration: 12 Periods (L:9 – T:3)**

M.C. and M.I types of ammeters and voltmeters - their construction and working – errors – remedies – comparison - shunts and multipliers for M.C instruments – problems on shunts and multipliers for M.C instruments - Dynamometer type ammeter, voltmeter and wattmeter–construction, working, and errors in them.

UNIT 3 – Power and Energy Measuring Instruments **Duration: 12 Periods (L:9 – T:3)**

Need for instrument transformers - applications of instrument transformers - measurement of power - measurement of energy – single phase induction type energy meter -construction and working, error and adjustments –construction and connections of a three - phase energy meter - construction and working of weston synchroscope.

UNIT 4 – Measurement of Basic Circuit Elements **Duration: 8 Periods (L: 6 – T:2)**

Classification of resistance -methods of resistance measurement -basic Ohmmeter circuit– difference in series and shunt type ohmmeters - construction and working of megger– measuring earth resistance using Megger – working principle, construction and applications of potentiometer - measurement of inductance – measurement of capacitance.

UNIT 5 – Transducers and Sensors **Duration: 10 Periods (L: 7.5 – T:2.5)**

Definition of transducer - need of transducer - classification of transducers - factors influencing selection of transducer - applications of transducers– thermocouple - thermister - working principle and use of strain gauge - construction, working and use of LVDT -basic concept of sensors and its applications– semiconductor sensors.

UNIT 6 – Electronic & Digital Instruments **Duration: 10 Periods (L:7.5 – T:2.5)**

Basic components of analog electronic instruments - working of rectifier type voltmeter and ammeter -basic components of digital (digital electronic) instruments - advantages of digital instruments over analog instruments - types of digital voltmeters -specifications of digital voltmeter - working of digital multimeter and its specifications -working of single phase digital energy meter with block diagram - working of three phase digital energy meter with block diagram - working of digital frequency meter with block diagram – phasor measurement unit - use of tongtester (clamp meter) – comparison between digital and electromechanical measuring instruments.

Recommended Books

1. A.K.Sawhney - Electrical and Electronic measuring instruments –Dhanpat Rai & Sons.
2. E.W.Golding and F.C.Widdis – Electrical Measurements and measuring instruments–Wheeler publishers.
3. David A Bell - Electronic Instrumentation and Measurements–Oxford.
4. B.L.Theraja- Electrical Technology -S.Chand & Co.
5. Khandpur - Modern Electronic Equipment
6. J.B.Gupta- Electrical and Electronic measuring instruments.
7. Harris - Electrical measurements
8. K.B.Bhatia- Study of Electrical Appliances and Devices– Khanna Publishers

Suggested E-learning references

1. http://electrical4u.com/
2. www.nptel.ac.in
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
4. https://nptel.ac.in/courses/108105053/

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

1.1 Define the following terms related to measuring instruments
i) accuracy ii)precision iii)error iv)resolution v) sensitivity

1.2 List any six important electrical quantities to be measured by giving their units

1.3 Mention the names of instruments to measure the various electrical quantities.

1.4 Classify instruments on the basis of construction and output as analog and digital instruments.

1.5 Classify the electro mechanical instruments according to principle of working.

1.6 Classify the instruments on basis of method of measuring the value as absolute and secondary instruments.

1.7 Distinguish between absolute and secondary instruments

1.8 State the types of secondary instruments (indicating, integrating and recording) by giving suitable examples.

1.9 State the purpose of obtaining deflecting, controlling and damping torques in indicating instruments.

1.10 Explain the methods of obtaining i) deflecting torque ii) controlling torque and iii) damping torque in indicating instruments.

1.11 Classify the errors according to its source (gross, systematic and random)

2.1 Describe the construction of permanent magnet moving coil instrument.

2.2 Explain the working of permanent magnet moving coil instrument (voltmeter/ammeter).

2.3 Solve simple problems on deflecting torque T_d=NBIA

2.4 List the three types of errors commonly occurring in moving coil (M.C.) instruments.

2.5 Mention the remedies for the commonly occurring errors in M.C instruments.

2.6 State advantages and disadvantages of M.C instruments.

2.7 List the applications of M.C instruments.

2.8 Describe the construction and working of moving iron (M.I) i) Attraction type Instrument ii) Repulsion type Instrument.

2.9 List the errors commonly occurring in M.I. Instruments.

2.10 State the advantages and disadvantages of M.I. instruments.

2.11 Compare M.C. and M.I instruments.

2.12Describe the method of extending the range of moving coil ammeter with the help of shunt.

2.13 Describe the method of extending the range of moving coil voltmeter with the help of multiplier.

2.14 Solve the problems on shunts and multipliers used for moving coil instruments.

2.15 Describe the construction of dynamometer type instruments

2.16 Explain the working of dynamometer type instruments

2.17 List the common errors in the dynamometer instruments.

2.18 List the advantages and disadvantages of dynamometer instruments.

3.1 State the need for instrument transformers (current transformer–CT and potential transformers -PT).

3.2 List the applications of CT and PT.

3.3 State the precautions when using CT.

3.4 Draw the circuit diagram for measuring power with wattmeter in single– phase circuit in conjunction with instrument transformers.

3.5 Draw the circuit diagram and explain the methods of measuring power and power factor in 3– phase circuit using single, two and three wattmeters

3.6 Describe the construction of a 1-phase induction type energy meter.

3.7 Explain the working of a 1-phase induction type energy meter.

3.8 Define meter constant.

3.9 State the common errors and their remedies in 1-phase energy meter.

3.10 Describe construction and connections of a 3-phase energy meter.

3.11 Describe the construction of Weston synchroscope.

3.12 Explain the working of Weston synchroscope.

4.1 Classify the resistance into low, medium and high values giving examples for each.

4.2 List the methods of measurement of i) low resistance ii) medium resistance and iii) high resistance

4.3 Draw the circuit diagram of basic ohm-meter.

4.4 Explain the working of basic ohm-meter.

4.5 Describe series type ohm-meter.

4.6 Describe shunt type ohm-meter.

4.7 Distinguish between shunt and series ohm-meters.

4.8 Describe the construction of megger.

4.9 Explain the working of megger.

4.10 Explain the method of measurement of earth resistance using earth megger. (construction and working of earth megger is not required).

4.11 Describe the construction of basic potentiometer with a legible sketch.

4.12 Explain the working of basic potentiometer with a legible sketch.

4.13 Explain the measurement of unknown resistance using potentiometer.

4.14 List the applications of potentiometer.

4.15 List various bridges used to measure inductance.

4.16 List various bridges used to measure capacitance.

5.1 Define transducer.

5.2 State the need of transducers in measurement systems.

5.3 Classify transducers

i) based on the principle of transduction ii) as primary and secondary iii) as passive and active iv) as analog and digital v) as transducers and inverse transducers

5.4 Explain the factors influencing the choice of transducer.

5.5 State the applications of transducers.

5.6 Explain the use of thermocouple for the measurement of temperature.

5.7 Explain the measurement of temperature using thermister in a bridge circuit.

5.8 State the working principle of strain gauge.

5.9 Describe the construction of Linear Variable Differential Transformer(LVDT).

5.10 Explain the working of LVDT.

5.11 State the advantages and disadvantages of LVDT.

5.12 Explain the concept of sensor.

5.13 List the applications of sensors.

5.14 Explain semiconductor sensors.

6.1 List the basic components of analog electronic instruments.

6.2 List various analog electronic instruments.

6.3 Explain the working of rectifier type voltmeter and ammeter.

6.4 List the basic components of digital (digital electronic) instruments.

6.5 List the advantages of digital instruments over analog instruments.

6.6 List the types of digital voltmeters.

6.7 Mention the specifications of digital voltmeter.

6.8 Explain the working of digital multimeter by giving its specifications.

6.9 Explain the working of single phase digital energy meter with block diagram.

6.10 Explain the working of three phase digital energy meter with block diagram.

6.11 Explain the working of digital frequency meter with block diagram.

6.12 Describe the working principle of phasor measurement unit with block diagram

6.13 List the applications of phasor measurement units

6.14 State the uses of tong tester (clamp meter).

6.15 Compare digital and electromechanical measuring instruments.

Suggested Student Activities

1. Prepare a report on the methods adopted for calibration of digital energy meters in TSSPDCL/TSNPDCL.
2. Prepare a report on various meters used in nearby industries or substations.
3. Visit any nearby factory / industry and prepare a report on applications of various transducers in that industry clearly mentioning the purpose.
4. Using megger, determine the earth resistance of the earth pit at your college and prescribe suitable measures to maintain the earth resistance at optimum value
5. Prepare posters indicating usage of suitable meters/ instruments with circuits to measure current, voltage, power and energy in DC and AC (Single phase) circuits
6. Mini project on measurement methods of Resistance, Inductance and Capacitance
7. Student visits lab to identify the available electrical measuring instruments
8. Visit MRT division Electricity Department to understand the testing and repair of various measuring instruments. Write a report on observations.
9. Visit any Electrical / Electronic Measuring Instrument manufacturing industry to observe and understand the construction and working of various meters. Write a Report on observation.
10. Quiz
11. Group discussion
12. Surprise test
13. Assignment
14. Seminar

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1		3								1	2, 10
CO2	1	3								1	1, 2, 10
CO3	1	3								1	1, 2, 10
CO4	2	3								1	1, 2, 10
CO5	1	3								1	1,2,10
CO6	1	3								1	1,2,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

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

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III semester Mid Semester-I Examination

Corse Code:18EE-304C **Duration:1 hour**
Course Name: Electrical & Electronic Measuring Instruments **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1. Define accuracy related to measuring instruments.
2. Classify errors according to its source.
3. List the three types of errors commonly occurring in moving coil instruments.
4. List the advantages of dynamometer instruments.

PART-B

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5. a) List any six important electrical quantities to be measured by giving their units.

OR

b) State the purpose of obtaining damping torque in indicating instruments.

6. a) List the applications of moving coil instruments.

OR

b) Compare moving coil and moving iron instruments in any three aspects.

PART-C

Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7. a) Explain the methods of obtaining controlling torque in indicating instruments.

OR

b) Distinguish between absolute and secondary instruments.

8. a) Explain the working of permanent magnet moving coil instrument.

OR

b) Describe the method of extending the range of moving coil ammeter with the help of shunt.

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III semester Mid Semester-II Examination

Corse Code:18EE-304C **Duration:1 hour**
Course Name: Electrical & Electronic Measuring Instruments **Max.Marks:20**

PART-A

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1) List the applications of current transformer
2) State the need for instrument transformers
3) List the applications of potentiometer
4) List various bridges used to measure capacitance

PART-B

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5) a) State the precautions when using CT.

OR

b) State the common errors in 1-phase energy meter.

6) a) Draw the circuit diagram of basic ohm-meter.

OR

c) Write various methods of measuring high resistance.

PART-C

Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7) a) Describe the construction of Weston synchroscope.

OR

b) Draw the circuit diagram for measuring power with wattmeter in single– phase circuit in conjunction with instrument transformers.

8) a) Explain the working of basic potentiometer with a legible sketch.

OR

c) Distinguish between shunt and series ohm-meters in any five aspects.

State Board of Technical Education and Training,Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Corse Code:18EE-304C **Duration:2 hours**
Course Name: Electrical & Electronic Measuring Instruments **Max.Marks:40Marks**

PART-A

Answer **all** questions 8**x1 =8 Marks**

1) Define resolution of a measuring instrument.
2) State the need for instrument transformers.
3) Define transducer.
4) List various bridges used to measure inductance.
5) List the applications of sensors.
6) Classify transducers based on the principle of transduction.
7) State the uses of tong tester.
8) List the types of digital voltmeters.

PART-B

Answer **four** questions **4 x 3 = 12 Marks**

9) a) State the types of secondary instruments.

OR

b) State the applications of transducers.

10 a) State the precautions while using current transformer.

OR

b) List the advantages of digital instruments over analog instruments.

11. a) State the disadvantages of Linear Variable Differential Transformer.

OR

b) State the working principle of strain gauge.

12. a) List the basic components of analog electronic instruments.

OR

b) Mention the specifications of digital voltmeter.

PART-C

Answer **four** questions **4 x 5 = 20 Marks**

13. a) Describe the method of extending the range of moving coil voltmeter with the help of multiplier.

OR

b) Explain the use of thermocouple for the measurement of temperature.

14. a) Explain the working of basic ohm-meter.

OR

b) Explain the working of rectifier type voltmeter.

15. a) Describe the construction of Linear Variable Differential Transformer.

OR

b) Explain the factors influencing the choice of transducer.

16. a) Explain the working of digital multimeter.

OR

b) Explain the working of digital frequency meter with block diagram.

ELECTRONIC CIRCUITS

Course Title	**: Electronic Circuits**	Course Code	**: 18EE-305C**
Semester	**: III**	Course Group	**: Core**
Teaching Scheme in periods (L : T : P)	**: 45 : 15 : 0**	Credits	**: 3**
Methodology	**: Lecture + Tutorial**	Total Contact Periods	**: 60**
CIE	**: 60 Marks**	SEE	**: 40 Marks**

Pre requisites

Basic knowledge of semiconductor devices and basic electrical and electronics principles.

Course Outcomes

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

CO 1	Realize rectifier and regulated power using diode, zener diode
CO 2	Describe the construction and applications of FET
CO 3	Apply biasing to stabilize operating point of a transistor
CO 4	Develop various amplifier applications of BJT
CO 5	Construct various op-amp circuits
CO 6	Apply feedback to construct oscillators circuits using BJT

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Diode Applications	8	4	1		9(a)	13(a)
2	Field Effect Transistors	12					
3	Transistor Biasing	8		2		10(a)	14(a)
4	Transistor Amplifiers	12					
5	Op-amp and applications	12		3	5, 6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
6	Oscillators	8			7, 8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
Total		60	8			8	8

Course Contents

UNIT 1 – Diode Applications **Duration: 08 Periods (L: 6 - T: 2)**

Diode: Ideal and Practical Model, Concept of Diode as Switch, Series and Shunt Clippers (Unbiased). Rectifiers: Definition – Ripple Factor, Ripple Frequency, Efficiency, PIV. Half-wave rectifier: Realization using Ideal diodes, Operation and wave forms for R-Load. Full-wave Rectifier: Realization using Ideal Diodes, Operation and waveforms of Centre-tapped and Bridge Configuration for R-Load. Filters: Need, Types of Filter. Voltage regulated power supply using Zener Diode-problems

UNIT 2 - Field Effect Transistors **Duration: 12 Periods (L:9 - T: 3)**

Classification of FET, JFET –N-channel JFET- construction, working and characteristics, Specifications – Drain Saturation current, Amplification Factor, Dynamic drain resistance, Trans-conductance and relation among them Application of JFET-variable voltage resistor- Comparison between FET And BJT MOSFETS: Symbol of N-channel and P- channel Enhancement Type MOSFETs, N-Channel Enhancement Type MOSFET- construction, working- drain and transfer characteristics. N-Channel Depletion Type - construction, working- drain and transfer characteristics -Applications of MOSFETS-Handling precautions of MOSFET

UNIT 3 - Transistor Biasing **Duration: 08 Periods (L: 6 - T: 2)**

Need for transistor biasing, Dc load line, operating point, Stability factor, Expression for Stability factor for Collector to Base bias and potential divider bias methods for transistor

UNIT 4 - Transistor Amplifiers **Duration: 12 Periods (L: 9 - T: 3)**

Amplifier: definition, faithful amplification, Classification of Amplifiers, Transistor CE amplifier with biasing. Multistage amplifiers: Need, Definition-Gain, Frequency response, decibel Gain, Bandwidth, expression for voltage gain-Problems- Coupling methods, Working and Frequency Response of two-stage R.C coupled, transformer coupled and Direct coupled Amplifiers and their applications, Comparison among different types of coupling. Power amplifier: Need, Comparison between voltage and power amplifier, classification of power amplifiers, Class B- Push pull amplifier and complementary-symmetry push-pull amplifier

UNIT 5 - Op-amp and applications **Duration: 12 Periods (L: 9 - T: 3)**

Basic differential amplifier: Working principle. Op-amp: Block diagram, pin diagram of IC741, ideal and practical characteristics. Op-amp parameters: Input offset voltage, input offset current, CMRR, input and output impedance, gain, gain-bandwidth product, slew-rate. Open-loop configuration: -limitation-use as comparator. Closed-loop configuration: Concept of virtual ground, applications - inverting, non-inverting, voltage follower, scale-changer, summing amplifiers, differentiator, integrator-Simple problems.

UNIT 6 - Oscillators **Duration: 08 Periods (L:6 - T: 2)**

Concept of feedback and types- open and closed loop gains - Barkhausen criteria- LC Tank circuit and stability. Working of Hartley, Colpitts and RC phase-shift oscillator; Working of UJT relaxation oscillators. Mention on applications and features of these oscillators.

Recommended Books

1. Electronic Devices and circuits by David. A. Bell, 4th ed., PHI
2. Electronic Device and circuits –T. F. Bogart Jr., J. S. Beasley and G. Rico., Pearson Education, 6th edition, 2004
3. Electronics Principles - Albert Malvino, J. Bates, 7th ed., Tata Mc Graw Hill Education (TMH) publishers
4. Electronic Device and Circuits, 2nd ed. , S. Salivahanan, N. Suresh Kumar, A Vallavaraj, Tata Mc Graw Hill Education (TMH) publishers, 2008

Suggested E-learning references

1. https://www.explainthatstuff.com/electronics.html
2. https://onlinecourses.nptel.ac.in/noc17_ee02/preview
3. https://www.electronicshub.org/diy-projects/
4. https://www.tutorialspoint.com/amplifiers/index.htm

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

1.1 Define ideal diode.
1.2 Define practical diode.
1.3 Explain the use of diode as a switch.
1.4 What is meant by clipper
1.5 List the various types of clipper circuits
1.6 Describe the operation of series and shunt clippers with help of circuit diagrams and waveforms
1.7 Define rectifier and list the different types of rectifiers.
1.8 Define the terms a) Ripple factor b)Ripple frequency c)Efficiency d) Peak Inverse Voltage of diode for a rectifier.
1.9 Explain the operation of half-wave rectifier circuit with waveforms and circuit for a R-load.
1.10 Explain the operation of full-wave center-tapped rectifier circuit with waveforms and circuit for a R-load.
1.11 Explain the operation of full-wave bridge rectifier circuit with waveforms and circuit for a R-load.
1.12 Define filter and state its need in DC power supplies
1.13 List various types of filter used in power supplies
1.14 Explain the operation of Zener diode voltage regulator.
1.15 Design a voltage regulated power supply using Zener diode-Problems

2.1. Classify FET based on construction.
2.2. Explain the operation and characteristics of N- channel JFET with a sketch.
2.3. Define Pinch-off voltage of JFET.
2.4. List the important specifications of JFET
2.5. Define important parameters of JFET and obtain relation among them.
2.6. Compare JFET and BJT
2.7. Explain why BJTs are called bipolar devices while FETs are called unipolar devices
2.8. Briefly describe some applications of JFET.
2.9. Explain how FET is used as a voltage variable resistor
2.10. Define a MOSFET.

2.11. List the types of MOSFET and give their symbols
2.12. Explain the construction and principle of operation about Enhancement type N-channel MOSFET
2.13. Explain the construction and principle of operation about Depletion type N-channel MOSFET
2.14. List few applications of MOSFET.
2.15. List the handling precautions of MOSFET

3.1 Explain the operation of transistor as an amplifier.
3.2 Explain the concept of DC load line.
3.3 Determine the Q point (operating point) on the DC load line.
3.4 State the necessity of proper biasing for a transistor amplifier.
3.5 List the causes for instability of biasing in a transistor amplifier.
3.6 Explain the need for stabilization and define the stability factor
3.7 Explain collector to base biasing method.
3.8 Explain potential divider biasing method.

4.1 Define an Amplifier and faithful amplification.
4.2 Classify amplifiers on the basis of frequency, function, type of load, period of Conduction and Number of stag es.
4.3 Draw the practical transistor CE amplifier and explain the function of each component
4.4 Explain the need for multistage amplifier.
4.5 Define the terms gain, decibel gain, frequency response and band width of an amplifier.
4.6 Solve simple problems related to gain and decibel gain of multi-stage amplifiers.
4.7 Explain the principle of operation and frequency response of two stage RC coupled amplifier with circuit diagram
4.8 Explain the principle of operation and frequency response of two stage transformer coupled amplifier with circuit diagram
4.9 Explain the principle of operation of direct coupled amplifier with circuit diagram
4.10 Compare different types of couplings.
4.11 List applications of RC coupled, Transformer coupled and direct coupled amplifiers.
4.12 State the need for a power amplifier.
4.13 Distinguish between voltage amplifiers and power amplifiers
4.14 Explain the working of class-B push-pull power amplifier.
4.15 Explain the working principle of complementary push pull power amplifier

5.1 Define and explain the working of differential amplifier.
5.2 Explain the block diagram of operational amplifier.
5.3 Define differential and common mode gain.
5.4 Draw the symbol of op-amp and mark terminals.
5.5 Draw the pin configuration of IC 741
5.6 State the important ideal and practical characteristics of an op-amp.
5.7 Explain the working of op-amp as comparator.
5.8 What are the limitations of open-loop configuration
5.9 Explain the working of inverting amplifier configuration of op-amp and derive the voltage gain equation.
5.10 Explain the concept of virtual ground.
5.11 Explain the working of non-inverting amplifier configuration of op-amp and derive the voltage gain equation.
5.12 Explain the use of op-amp as a)Voltage follower, b) Scale changer, c)Summing amplifier, d)Differentiator and e) Integrator.
5.13 Solve simple problems on above circuits

6.1 Define feedback and feedback factor.
6.2 Explain negative and positive feedback.
6.3 Draw the block diagram of feed-back amplifier and explain.
6.4 Derive the expression for gain of a feed-back amplifier.
6.5 State the effect of negative feedback on gain, band-width, noise and distortion, input and output impedance.

6.6 List the advantages of negative feed-back.
6.7 List the application of negative and positive feedback.
6.8 Define Oscillator.
6.9 Classify different types of oscillators.
6.10 State Barkhausen criteria for oscillator.
6.11 Explain the working of Hartley Oscillator.
6.12 Explain the working of Colpitts Oscillator.
6.13 Explain the working of RC phase shift Oscillator.
6.14 Explain the working of UJT relaxation Oscillator.
6.15 List the applications of oscillators.

Suggested Student Activities

1. Student visits library to refer to Electronic Journals
2. Student visits the Lab to construct the circuits on a bread board
3. Ask the students to purchase different electronic devices from a shop
4. Making use of online simulation laboratories
5. Group discussion
6. Surprise test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	2	2	1	1						2	1, 2, 4, 10
CO2	2	2								3	1, 2,10
CO3	1	2		1							1, 2, 4
CO4	1	2		1						3	1, 2, 4, 10
CO5	1	2		1						3	1, 2, 4, 10
CO6	1	2		1						3	1, 2, 4,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

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

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-I Examination

Corse Code: 18EE-305C **Duration: 1 Hour**
Course Name: Electronic Circuits **Max.Marks: 20**

PART-A

Answer **all** questions, Each Question carries *one* mark 4**x1 = 4 Marks**

1) Define an Ideal Diode.
2) Define Rectifier.
3) Draw the symbol of N-channel Depletion type Mosfet.
4) List any two applications of MOSFET.

PART-B

Answer the following questions. Each question carries *three* marks **2x 3 = 6 Marks**

5)
a) State the need for filter in a rectifier based Dc power supply.
(OR)
b)Draw the circuit and state in brief working of series positive clipper.

6)
a) Compare BJT and JFET
(OR)
b) FET is an unipolar device, Justify.

PART-C

Answer the following questions. Each question carries *five* marks **2x5 = 10Marks**

7) a) Explain the operation of Half-wave rectifier circuit with waveforms for a resistive load.

(OR)
b) Explain the operation of Zener diode voltage regulator.

8) a) Explain how a JFET is used as a voltage variable resistor.
(OR)
b) Explain the construction and principle of operation of Enhancement type N-channel MOSFET

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-II Examination

Corse Code: 18EE-305C **Duration: 1 Hour**
Course Name: Electronic Circuits **Max.Marks: 20**

PART-A

Answer **all** questions, Each Question carries *one* mark 4**x1 = 4 Marks**

1) Define transistor biasing.
2) In which region the operating point of a transistor must be located for it to work as an amplifier?
3) Define an amplifier.
4) Define amplifier gain.

PART-B

Answer the following questions. Each question carries *three* marks **2x 3 = 6 Marks**

5) a) Briefly state the concept of DC load line.
(OR)
b) State the necessity of proper biasing for a transistor amplifier.
6) a) State the need for multi-stage amplifiers.
(OR)
b) List the applications of R-C coupled amplifiers.

PART-C

Answer the following questions. Each question carries *five* marks **2x5 = 10Marks**

7) a) Explain the need for stabilization and define the stability factor.
(OR)
b) Explain collector to base biasing method for a transistor.

8) a) Explain the principle of operation and frequency response of two stage RC coupled amplifier with circuit diagram.

(OR)
b) Explain the working of class-B push-pull power amplifier.

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Corse Code: 18EE-305C **Duration: 2 Hours**
Course Name: Electronic Circuits **Maximum .Marks: 40**

PART-A

Answer all questions **8x1 = 8 Marks**

1) Draw the symbol of n-channel JFET.
2) Define the term frequency response for an amplifier.
3) Define feed-back factor.
4) Define Peak Inverse voltage of a diode.
5) Draw the symbol of OP-Amp.
6) Define CMRR of an OP-Amp.
7) Define an oscillator.
8) State Barkhausen criteria for oscillator.

PART-B

Answer the following questions **4x3= 12 Marks**

9)
a) List different types of MOSFETs and draw their symbols.
(OR)
b) Draw the pin configuration of IC 741.

10)
a) State the necessity of proper biasing for a transistor amplifier.
(OR)
b) Derive the expression for gain of a Negative feed-back amplifier

11)
a) State the important ideal characteristics of an op-amp.
(OR)
b) Briefly state the concept of virtual ground.

12)
a) Classify different types of oscillators.
(OR)
b) State the role of RC network in RC phase-shift oscillator and write the expression for frequency of oscillation.

PART-C

Answer the following questions **4x 5=20 Marks**

13)
a) Explain the operation of full-wave center-tapped rectifier circuit with waveforms and circuit for a R-load.

(OR)
b) Explain the use of OP-Amp as Summing amplifier.

14)

a) Explain the principle of operation of direct coupled amplifier with circuit diagram.

(OR)

b) State the effect of negative feedback on gain, band-width, noise and distortion, input and output impedance.

15)

a) Explain the working of non-inverting amplifier configuration of op-amp and derive the voltage gain equation.

(OR)

b) Explain the use of op-amp as a Differentiator.

16)

a) Explain the working of Hartley Oscillator.

(OR)

b) Explain the working of UJT relaxation Oscillator.

CIRCUITS LAB PRACTICE

Course Title :	**: Circuits Lab Practice**	Course Code	**: 18EE-306P**
Semester	**: III**	Course Group	**: Practical**
Teaching Scheme in Periods(L:T:P)	**: 15:0:30**	Credits	**: 1.5**
Methodology	**: Lecture + Practical**	Total Contact Periods	**: 45Pds**
CIE	**: 60 Marks**	SEE	**: 40 Marks**

Pre requisites:

This course requires

- Data handling through graphs:
  - Select proper X & Y parameters
  - Choose proper scale
  - Analyse the trend of the graph
  - Correlate trend of the graph with the relation between the parameters
- Use of Voltmeter, Ammeter, Wattmeter & CRO
- The knowledge of electrical circuits

Course Outcomes:

At the end of the course the students will have the ability to:

Course Outcomes	
CO1	Verify Ohms law
CO2	Apply Kirchhoff's laws to solve electric circuits
CO3	Apply network theorems to solve electric circuits
CO4	Verify the voltage, current phasor relationship in 1-Φ AC circuits with R, RL and RC loads

Suggested Learning Outcomes

1.0 Verify Ohms law

1.1 Verify Ohm's law
1.2 Verify limitations of Ohm's law

2.0 Apply Kirchhoff's laws to solve electric circuits

2.1 Verify Kirchhoff's current law in a DC circuit
2.2 Verify Kirchhoff's voltage law in a DC circuit

3.0 Apply network theorems to solve electric circuits

3.1 Verify Thevenin's theorem in a DC circuit
3.2 Verify Norton's theorem in a DC circuit
3.3 Verify Maximum power transfer theorem in a DC circuit
3.4 Verify Super position theorem in a DC circuit with two sources

4.0 Verify the voltage, current phasor relationship in 1-Φ AC circuits with R, RL and RC loads

4.1 Verify that the voltage and current for 1-Φ AC circuit with pure R- load are in-phase using CRO and draw the phasor diagram.
4.2 Verify that the current in 1-Φ AC circuit with pure RL - load lags the voltage using CRO and draw the phasor diagram.
4.3 Verify that the current in 1-Φ AC circuit with pure RC - load leads the voltage using CRO and draw the phasor diagram.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	3	3	3				3	2		1,2,3,4,8,9
CO2	1	3	3	3				3	2		1,2,3,4,8,9
CO3	1	3	3	3				3	2		1,2,3,4,8,9
CO4	1	3	3	3				3	2	3	1,2,3,4,8,9

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-I Examination

Corse Code: 18EE-306P **Duration: 1 Hour**
Course Name: Circuits Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Verify Ohm's law
2. Verify limitations of Ohm's law
3. Verify Kirchhoff's current law in a DC circuit
4. Verify Kirchhoff's voltage law in a DC circuit

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-II Examination

Corse Code: 18EE-306P **Duration: 1 Hour**
Course Name: Circuits Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Verify Thevenin's theorem in a DC circuit
2. Verify Norton's theorem in a DC circuit
3. Verify Maximum power transfer theorem in a DC circuit
4. Verify Super position theorem in a DC circuit with two sources

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Corse Code: 18EE-306P **Duration: 2 Hour**
Course Name: Circuits Lab Practice **Max.Marks: 40**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Verify Ohm's law
2. Verify limitations of Ohm's law
3. Verify Kirchhoff's current law in a DC circuit
4. Verify Kirchhoff's voltage law in a DC circuit
5. Verify Thevenin's theorem in a DC circuit
6. Verify Norton's theorem in a DC circuit
7. Verify Maximum power transfer theorem in a DC circuit
8. Verify Super position theorem in a DC circuit with two sources
9. Verify that the voltage and current for 1-Φ AC circuit with pure R- load are in-phase using CRO and draw the phasor diagram.
10. Verify that the current in 1-Φ AC circuit with pure RL - load lags the voltage using CRO and draw the phasor diagram.
11. Verify that the current in 1-Φ AC circuit with pure RC - load leads the voltage using CRO and draw the phasor diagram.

DC MACHINES LAB PRACTICE

Course Title :	**: DC Machines Lab Practice**	Course Code	**18EE-307P**
Semester	**: III**	Course Group	**Practical**
Teaching Scheme in Periods (L:T:P)	**: 15:0:30**	Credits	**1.5**
Methodology	**: Lecture + Practical**	Total Contact Periods	**45**
CIE	**: 60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the skills of handling electrical tools, accessories and performing wiring connections

Course Outcomes

At the end of the course the students will have the ability to:

Course Outcomes	
CO1	Identify the terminals of DC Motors and parts of Starters
CO2	Sketch the performance characteristics of DC Motors by conducting suitable Tests.
CO3	Apply various speed control methods on DC motors
CO4	Draw and interpret the performance characteristics of DC Generators by Conducting suitable experiments.

Suggested Learning Outcomes

1.0 Identify the terminals of DC Motors and parts of Starters.

1.1 Identify the terminals of DC Shunt Motors
1.2 Identify the terminals of DC Series Motors
1.3 Identify the terminals of DC Compound Motors
1.4 Identify the parts of DC 3 point starter
1.5 Identify the parts of DC 4 point starter

2.0 Sketch the performance characteristics of DC Motors by conducting suitable Tests.

2.1. Obtain performance characteristics by conducting Brake Test on DC Shunt Motor
2.2. Obtain performance characteristics by conducting Brake Test on DC Series Motor.
2.3. Obtain performance characteristics by conducting Brake Test on DC Compound Motor.
2.4 Obtain performance of DC Shunt Motor by conducting Swinburne's Test.

3.0 Apply various speed control methods on DC motors

3.1 Speed control of DC Shunt Motor by Armature control method
3.2 Speed control of DC Shunt Motor by Field control method

4.0 Draw and interpret the performance characteristics of DC Generators by Conducting suitable experiments.

4.1 Obtain OCC of a DC shunt Generator at rated speeds
4.2 Obtain Internal and External characteristics of DC Shunt Generator
4.3 Obtain Internal and External characteristics of DC Series Generator.
4.4 Obtain Internal and External characteristics of DC Compound Generator

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1		3	3	1				3	2		2,3,4,8,9
CO2	2	3	3	3				3	2		1,2,3,4,8,9
CO3	2	3	3	3				3	2		1,2,3,4,8,9
CO4	2	3	3	3				3	2		1,2,3,4,8,9

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-I Examination

Course Code: 18EE-307P **Duration: 1 Hour**
Course Name: DC Machines Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Identify the terminals of DC Shunt motor
2. Identify the terminals of DC Series motor
3. Identify the terminals of DC Compound motor
4. Identify the parts of a 3 point starter
5. Identify the parts of a 4 point starter
6. Obtain performance characteristics by conducting Brake Test on DC Shunt Motor
7. Obtain performance characteristics by conducting Brake Test on DC Series Motor.

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-II Examination

Course Code: 18EE-307P **Duration: 1 Hour**
Course Name: DC Machines Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Obtain performance characteristics by conducting Brake Test on DC Compound Motor.
2. Obtain performance of DC Shunt Motor by conducting Swinburne's Test.
3. Speed control of DC Shunt Motor by Armature control method
4. Speed control of DC Shunt Motor by Field control method

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Course Code: 18EE-307P **Duration: 2 Hour**
Course Name: DC Machines Lab Practice **Max.Marks: 40**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Identify the terminals of DC Shunt motor
2. Identify the terminals of DC Series motor
3. Identify the terminals of DC Compound motor
4. Identify the parts of a 3 point starter
5. Identify the parts of a 4 point starter
6. Obtain performance characteristics by conducting Brake Test on DC Shunt Motor
7. Obtain performance characteristics by conducting Brake Test on DC Series Motor.
8. Obtain performance characteristics by conducting Brake Test on DC Compound Motor.
9. Obtain performance of DC Shunt Motor by conducting Swinburne's Test.
10. Speed control of DC Shunt Motor by Armature control method
11. Speed control of DC Shunt Motor by Field control method
12. Obtain OCC of a DC shunt Generator at rated speeds
13. Obtain Internal and External characteristics of DC Shunt Generator
14. Obtain Internal and External characteristics of DC Series Generator.
15. Obtain Internal and External characteristics of DC Compound Generator

ELECTRICAL MEASUREMENTS LAB PRACTICE

Course Title :	**: Electrical Measurements Lab Practice**	Course Code	**: 18EE-308P**
Semester	**: III**	Course Group	**: Practical**
Teaching Scheme in Periods(L:T:P)	**: 15:0:30**	Credits	**: 1.5**
Methodology	**: Lecture + Practical**	Total Contact Periods	**: 45**
CIE	**: 60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the knowledge of basic electricity and fundamentals of various measuring instruments

Course Outcomes

At the end of the course the students will have the ability to:

Course Outcome	
CO1	Compare calibrated meter readings with standard meters
CO2	Illustrate the methods of range extension in A.C. & D.C. meters
CO3	Interpret the various methods to measure unknown resistance
CO4	Demonstrate various methods of measuring power in three phase circuit

Suggested Learning Outcomes

1.0 Compare calibrated meter readings with standard meters

1.1 Calibration and testing of single phase energy meter

1.2 Calibration of dynamometer wattmeter

1.3 Calibration of PMMC Ammeter and PMMC voltmeter

1.4 Calibration of LPF wattmeter

2.0 Illustrate the methods of range extension in A.C. & D.C. meters

2.1 Extend the range of D.C. ammeter by using shunt resistances (low range to high range)

2.2 Extend the range of D.C. voltmeter by using series multiplier(low range to high range)

2.3 Extend the range of A.C. ammeter by using C.T.(high range to low range)

2.4 Extend the range of A.C. voltmeter by using P.T.(high range to low range)

3.0 Interpret the various methods to measure unknown resistance

3.1 Measurement of low and medium resistance by volt-ampere method

3.2 Measurement of resistance by Kelvin's double Bridge.

3.3 Measurement of earth resistance using digital earth tester

3.4 Measurement of insulation resistance using digital insulation tester

4.0 Demonstrate various methods of measuring power in three phase circuit

4.1 Measurement of power in a three-phase balanced circuit with two watt meter method

4.2 Measurement of three phase power by 3-voltmeter and 3-Ammeter methods

Note:

1. Every student has to bring insulated tool kit and follow the general safety precautions throughout the lab sessions
2. Whenever handling/using a meter check for 'zero' position of the pointer and adjust for 'zero' position if there is any deviation.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	3	3	3				3	2		1, 2, 3, 4, 8, 9
CO2	1	3	3	3				3	2		1, 2, 3, 4, 8, 9
CO3	1	3	3	3				3	2		1,2, 3, 4, 8, 9
CO4	1	3	3	3				3	2		1,2, 3, 4, 8, 9

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-I Examination

Course Code: 18EE-308P **Duration: 1 Hour**
Course Name: Electrical Measurements Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer wattmeter
3. Calibration of PMMC Ammeter and PMMC voltmeter
4. Calibration of LPF wattmeter
5. Extend the range of D.C. ammeter by using shunt resistances (low range to high range)
6. Extend the range of D.C. voltmeter by using series multiplier(low range to high range)

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-II Examination

Course Code: 18EE-308P **Duration: 1 Hour**
Course Name: Electrical Measurements Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Extend the range of A.C. ammeter by using C.T.(high range to low range)
2. Extend the range of A.C. voltmeter by using P.T.(high range to low range)
3. Measurement of low and medium resistance by volt-ampere method
4. Measurement of resistance by Kelvin's double Bridge.
5. Measurement of earth resistance using digital earth tester
6. Measurement of insulation resistance using digital insulation tester

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Course Code: 18EE-308P **Duration: 2 Hour**
Course Name: Electrical Measurements Lab Practice **Max.Marks: 40**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer wattmeter
3. Calibration of PMMC Ammeter and PMMC voltmeter
4. Calibration of LPF wattmeter
5. Extend the range of D.C. ammeter by using shunt resistances (low range to high range)
6. Extend the range of D.C. voltmeter by using series multiplier(low range to high range)
7. Extend the range of A.C. ammeter by using C.T.(high range to low range)
8. Extend the range of A.C. voltmeter by using P.T.(high range to low range)
9. Measurement of low and medium resistance by volt-ampere method
10. Measurement of resistance by Kelvin's double Bridge.
11. Measurement of earth resistance using digital earth tester
12. Measurement of insulation resistance using digital insulation tester
13. Measurement of power in a three-phase balanced circuit with two watt meter method
14. Measurement of three phase power by 3-voltmeter and 3-Ammeter methods

ELECTRONICS LAB PRACTICE

Course Title	**:Electronics Lab Practice**	Course Code	**:18EE-309P**
Semester	**:III**	Course Group	**:Practical**
Teaching Scheme in Periods (L:T:P)	**:15:0:30**	Credits	**:1.5**
Methodology	**:Lecture + Practical**	Total Contact Periods	**:45**
CIE	**:60 marks**	SEE	**:40 Marks**

Pre requisites

Basic knowledge of semiconductor devices and basic electrical and electronics principles.

Course Outcomes

At the end of the course the students will have the ability to:

Course Outcome	
CO1	Measure voltage, frequency and phase of any waveform using CRO and function generator
CO2	Analyze rectifier circuits and regulated power supplies.
CO3	Obtain the characteristics of FET
CO4	Analyze the effect to varying feed-back circuit values on frequency of an oscillator circuit.
CO5	Design various Op-Amp circuits

Suggested Learning Outcomes

1.0 Measure voltage, frequency and phase of any waveform using CRO and function generator

1.1 Familiarize with CRO front panel controls and observe the effect of different settings to set intensity, Astigmatism and Focus controls to display

i) Medium frequency ii) Low frequency iii) High frequency

1.2 Set the controls of function generator and CRO to observe flicker free waveforms.

1.3 Measure amplitude, frequency, and time period of a signal from function generator by using CRO.

2.0 Analyze rectifier circuits and regulated power supplies.

2.1 Construct and test a switching circuit with diode as switching element.

2.2 Construct and test an unbiased i) Serial ii) Parallel clipper circuit.

2.3 Implement half wave rectifier with and without filter.

2.4 Implement Full-wave centre-tapped and Bridge rectifier with and without filter.

2.5 Build a regulated power supply and draw regulation characteristics using

i) Zener Diode ii) Positive 3 terminal regulator.

2.6 Implement a negative 3 Terminal Regulator and draw the regulation characteristics.

3.0 Obtain the characteristics of FET

3.1 Draw input and output characteristics of JFET and determine Pinch-Off voltage and Trans-conductance.

3.2 Show that a FET can be used as a constant current source with appropriate bias.

3.3 Apply -2 V to the gate circuit through resistors of value 10K, 100K and 1M separately and measure the output current and analyze.

4.0 Analyze the effect to varying feed-back circuit values on frequency of an oscillator circuit.

4.1 Construct RC coupled amplifier and draw its frequency response

4.2 Implement Hartley's and Colpitts oscillator and verify the effect of varying Tank circuit component values and observe wave form on CRO.

4.3 Construct RC phase shift oscillator and observe frequency by varying either R or C values

5.0 Design various Op-Amp circuits

5.1 Obtain the specifications of Operational amplifier 741 and Quad Op-amp LM 324 and comparator LM 339 ICs from data sheets

5.2 Construct and verify Inverting, non inverting amplifier and Buffer using Op-amp.

5.3 Construct and verify summing and difference amplifier using Op-amp.

5.4 Construct and verify differentiator or integrator using Op-amp.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1		3	3	3				3	2		2, 3, 4, 8, 9
CO2	1	3	3	3				3	2		1, 2, 3, 4, 8, 9
CO3	1	3	3	3				3	2		1,2, 3, 4, 8, 9
CO4	1	3	3	3				3	2		1,2, 3, 4, 8, 9

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-I Examination

Course Code: 18EE-309P **Duration: 1 Hour**
Course Name: Electronics Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. To familiarize with CRO front panel controls and observe the effect of different settings to set intensity, Astigmatism and Focus controls to display i) Medium frequency
2. To set the controls of function generator and CRO to observe flicker free waveforms.
3. Measure amplitude, frequency, and time period of a signal from function generator by using CRO.
4. To construct and test a switching circuit with diode as switching element.
5. Construct and test an unbiased Serial clipper circuit.
6. Construct and test an unbiased Parallel clipper circuit.
7. Implement half wave rectifier with and without filter.

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Mid Semester-II Examination

Course Code: 18EE-309P **Duration: 1 Hour**
Course Name: Electronics Lab Practice **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. Implement Full-wave centre-tapped and Bridge rectifier with and without filter.
2. To build a regulated power supply and draw regulation characteristics using zener diode
3. To build a regulated power supply and draw regulation characteristics using positive three terminal regulator
4. Implement a negative 3 Terminal Regulator and draw the regulation characteristics.
5. Draw input and output characteristics of JFET and determine Pinch-Off voltage and Trans-conductance.
6. Show that a FET can be used as a constant current source with appropriate bias.
7. Apply 2 V to the gate circuit through resistors of value 10K, 100K and 1M separately and measure the output current and analyze

State Board of Technical Education and Training, Telangana
Model Question paper
DEEE III Semester
Semester End Examination

Course Code: 18EE-309P **Duration: 2 Hour**
Course Name: Electronics Lab Practice **Max.Marks: 40**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

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

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

1. To familiarize with CRO front panel controls and observe the effect of different settings to set intensity, Astigmatism and Focus controls to display i) Medium frequency
2. To set the controls of function generator and CRO to observe flicker free waveforms.
3. Measure amplitude, frequency, and time period of a signal from function generator by using CRO.
4. To construct and test a switching circuit with diode as switching element.
5. Construct and test an unbiased Serial clipper circuit.
6. Construct and test an unbiased Parallel clipper circuit.
7. Implement half wave rectifier with and without filter.
8. Implement Full-wave centre-tapped and Bridge rectifier with and without filter.
9. To build a regulated power supply and draw regulation characteristics using zener diode
10. To build a regulated power supply and draw regulation characteristics using positive three terminal regulator
11. Implement a negative 3 Terminal Regulator and draw the regulation characteristics.
12. Draw input and output characteristics of JFET and determine Pinch-Off voltage and Trans-conductance.
13. Show that a FET can be used as a constant current source with appropriate bias.
14. Apply 2 V to the gate circuit through resistors of value 10K, 100K and 1M separately and measure the output current and analyse
15. Construct RC coupled amplifier and draw its frequency response
16. To implement Hartley's and Colpitts oscillator and verify the effect of varying Tank circuit component values and observe wave form on CRO.
17. Construct RC phase shift oscillator and observe frequency by varying either R or C values
18. Obtain the specifications of Operational amplifier 741 and Quad Op-amp LM 324 and comparator LM 339 ICs from data sheets
19. Construct and verify Inverting, non inverting amplifier and Buffer using Op-amp.
20. Construct and verify summing and difference amplifier using Op-amp.
21. Construct and verify differentiator or integrator using Op-amp.

COMMUNICATION SKILLS AND LIFE SKILLS

Course Title	**: Communication Skills and Life Skills**	Course Code	**: 18EE-310P**
Semester	**: III**	Course Group	**: Practical**
Teaching Scheme in Periods(L:T:P)	**: 15:0:30**	Credits	**: 1.5**
Methodology	**: Lecture + Practical**	Total Contact Periods	**: 45**
CIE	**: 60 Marks**	SEE	**40 Marks**

Pre requisites

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

Course Outcomes

At the end of the course the students will have the ability to:

	At the end of the course the students will have the ability to:
Listening Skills	Identify the main or the central idea. Listen for specific details. Learn the pronunciation.
Communication Skills – I	Learn relevant vocabulary to make introductions. Learn to introduce oneself in formal and informal situations. Learn vocabulary and expressions useful for describing objects Describe objects
Communication Skills – II	Learn vocabulary to talk about the past Describe the incidents that happened in the past Learn the techniques of organising the matter / content for one-minute speech. Speak fluently and accurately using appropriate body language.
Life Skills – I	Think positively. Develop positive attitude. Overcome negative attitude. Know the importance of setting goals. Set goals using SMART features.

Life Skills – II	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'. Learn to be creative. Think innovatively. Think critically.
Life Skills – III	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. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.

CO-PO Matrix

	Course Outcome		**Linked PO**
CO 1	Listening for main idea and specific details	**R/U/A**	**1, 2, 3, 4, 5,7,8, 9,10**
CO 2	Introduce oneself and Describe Objects	**R/U/A**	**1,2,3,8,9,10**
CO 3	Talk about the past and speak fluently for one minute	**R/U/A**	**1,2,3,7,8.9,10**
CO 4	Develop positive attitude and set short term and long term goals	**R/U/A**	**1,2,3,7,8,9,10**
CO 5	Learn to solve a problem, make decisions and think innovatively	**R/U/A**	**1,2,3,7,8,9,10**
CO6	Learn to become a good team member and leader	**R/U/A**	**1,2,3,7,8,9,10**

Course Contents:

I. Listening Skills **Duration: 9**

1. Listening – I
    - Digital Camera
    - A Dialogue
    - Wild Animal / Human conflict
2. Listening – II
    - A Recipe
    - A Telephone conversation
    - An Interview

II. Communication Skills – I **Duration:6**

3. Introducing Oneself
4. Describing Objects

III. Communication Skills – II **Duration:6**

5. Talking About the Past
6. Just A Minute

IV. Life Skills – I **Duration:6**

7. Attitude
8. Goal Setting

V. Life Skills – II **Duration:9**

9. Problem Solving and Decision-Making Skills
10. Critical Thinking & Creativity

VI. Life Skills – III **Duration:9**

11. Leadership and Teamwork
12. Time Management

Suggested Student Activities

- Listening Comprehension
- Seminars
- Paper Presentations
- Line ups for introducing oneself
- Describing persons / places / things
- Picture description
- Role Plays
- Dumb charades
- What is in the bag? (Identify the objects)
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Just A Minute
- Writing diary events
- 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

Evaluation Pattern

I. Continuous Internal Examination: 60 Marks

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

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

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. JAM or Role plays: 15 Marks
c. *Viva Voce* on any life skills topic : 15 Marks

References

Flint, Chrisand Jamie Flockhart*Listening: A2 (Collins English for Life: Skills)*Collins. 2013

Brown, Stephen E. English in Everyday Life. McGraw-Hill Education.2008

Mohanraj, Jayashree. *Let Us Hear Them Speak: Developing Speaking-Listening Skills in English*.Sage. 2015
Susan Earle – Carlin. *Q Skills for Success: Listening and Speaking 5: Student Book with Online Practice*. Oxford University Press. 2013
Kumar, Sanjay and Pushpa Latha. *Communication Skills: A Work Book*.Oxford University Press. 2018
Carnegie, Dale.*The Leader in You*. Simon & Schuster: 1995
Carnegie, Dale.*The Art of Public Speaking*. Prabhat Prakashan. NewDelhi.2013
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.
West, Steven. *Critical Thinking Skills: Practical Strategies for Better Decision making, Problem-Solving and Goal Setting.* Kindle Edition.2018
Tracy, Brain. *Goals*. Berret-Koehler PublishersInc. San Francisco. 2017

Tracy, Brain. *Master your Time Master your Life.* Penguin Random House Inc. New York. 2017

Sean Covey . *The 7 Habits of Highly Effective Teens.* Simon and Schuster,2011

E-Learning Resources

http://www.bbc.co.uk/worldservice/learningenglish/youmeus/learnit/learnitv39.shtml

https://www.examenglish.com/leveltest/listening_level_test.htm

https://www.oxfordonlineenglish.com/listening?utm_referrer=https%3A%2F%2Fwww.google.co.in%2F

https://takeielts.britishcouncil.org/prepare-test/free-ielts-practice-tests/listening-practice-test-1

https://learnenglish.britishcouncil.org/en/listening

https://www.cambridgeenglish.org/learning-english/activities-for-learners/?skill=listening

https://www.businessenglishsite.com/business-english-listening.html

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

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)

Florence Nightingale was an English social reformer and a statistician, and the founder of modern nursing. She was born in Florence, Italy, on May 12, 1820. Part of a wealthy family, Nightingale defied the expectations of the time and pursued what she saw as her God-given calling of nursing during the Crimean War. She and a team of nurses improved the unsanitary conditions at a British base hospital, greatly reducing the death count. Her writings sparked worldwide health care reform, and in 1860 she established St. Thomas' Hospital and the Nightingale Training School for Nurses. A revered hero of her time, she died on August 13, 1910, in London. Nightingale came to prominence while serving as a manager and trainer of nurses during the Crimean War, in which she organized care for wounded soldiers. She gave nursing a favourable reputation and became an icon of Victorian culture, especially in the persona of "The Lady with the Lamp" making rounds of wounded soldiers at night.

Questions:

1. Who was Florence Nightingale?
2. When and where was she born?
3. What does the passage convey?
4. When did she pass away?
5. Where did she establish nursing school?

PART- B **10 Marks**

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

2. How do you introduce yourself formally in an interview?
3. Describe your polytechnic.

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - II

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

Part – A **10 marks**

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

1. Describe how you have spent your summer vacation.

2. What are the features of good JAM presentation? What precautions do you before speaking for one minute on the given topic?

Part – B **10 marks**

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

3. What is positive attitude? Give examples of positive attitude from your life.

4. Mention your long term goal with SMART features. How do you achieve it?

BOARD DIPLOMA EXAMINATION (C-18)
THIRD SEMESTER 18 COMMON-310P
COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

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)

Answer the following questions after teacher reads the following paragraph.

Prof. Jayashankar was born to Mahalaxmi and Laxmi Kantha Rao on 6th August 1934 in Akkampet village, Warangal District. He was a Doctorate in Economics. He worked as a Vice-Chancellor of Kakatiya University. He worked in many capacities. He was popularly known as "Pedda Sir." He inspired many a people to fight for the cause of Telangana Statehood.

At the age of twelve, Jayashankar refused to sing songs in praise of the Nizam and insisted on singing Vande Mataram instead. As an intermediate student, in 1952, he protested against State Reorganization Committee plan to merge with the Andhra Rashtra. He took an active part in the agitations of "Non – Mulki go back" and " Idli Sambar go back." He took an active part in Telangana separate statehood agitation in 1969 too. In 1999, Prof. Jayashankar started the Telangana Development Forum in the USA which helped to propagate the injustice, discrimination and exploitation meted out to Telangana region and people in the aspects of employment, funds and water resources. He relentlessly put his efforts to end the struggle of Telangana people. He passed away on June 21, 2011. He was 76 years old at the time of his death.

Questions:

1. Where was Prof. Jayashankar born?
2. Why didn't he sing songs in praise of the Nizam?
3. Why did Jayashankar start the Telangana Development Forum in USA?
4. What are the two agitations in which he took an active part?
5. What is the meaning of 'relentlessly'?

Part – B **15 marks**

2. JAM / Role Plays

Part – C **15 marks**

3. Viva Voce on Life Skills topics

DEEE SKILL UPGRADATION ACTIVITY SHEET

Course Title	**: Skill Upgradation**	**Credits**	**:2.5**
Semester	**: III**	**Total Contact Periods**	**: 105**
Methodology	**: Activities**		

Suggested Course Outcomes

CO.1 Address the identified needs of the community collaboratively to facilitate positive social change.

a. Prepare a chart related to the topics covered in the present semester.
b. Listen to expert talk, guest lecture, youtube video and write a summary.
c. Participate in Haritha Haram and submit a small report about the activities.
d. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
e. Seminar on problems with possible solutions in the campus or nearby places
f. Group discussions or enacting a play on topics creating awareness about socio-economic problems
g. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
h. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.2 Listen attentively to others and respond appropriately

a. Listen to expert talk, guest lecture, youtube video and write a summary.
b. Participating in Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
c. Participate in quiz on technical aspects or current affairs
d. Participate in Mock Interview

(PO5, 7, 8, 9, 10)

CO.3 Adapt your style to the occasion, task, and audience

a. Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
b. Seminar on problems with possible solutions in the campus or nearby places
c. Participate in Mock Interview

(PO5, 6, 7, 8, 9, 10)

CO.4 Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.

a. Prepare a chart related to the topics covered in the present semester.
b. Refer to an e-journal and submit a summary report on upcoming technologies.
c. Visit factory / industry and submit a report/PPT on the observations made.
d. Prepare a mini project and submit report.

e. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
f. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
g. Seminar on problems with possible solutions in the campus or nearby places
h. Participate in Mock Interview

(PO5, 6, 7, 8, 9, 10)

CO.5 Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations

a. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
b. Seminar on problems with possible solutions in the campus or nearby places

(PO5, 6, 7, 8, 9, 10)

CO.6 Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.

a. Participate in Haritha Haram and submit a small report about the activities.
b. Participate in Swatch Bharath and write an essay on the importance of the program
c. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.7 Utilize others' ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others

a. Prepare a mini project and submit report.
b. Participate in Haritha Haram and submit a small report about the activities.
c. Participate in Swatch Bharath and write an essay on the importance of the program
d. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.8 Ability to recognize their strengths and those of others to work towards a shared vision.

a. Prepare a mini project and submit report.
b. Participate in Haritha Haram and submit a small report about the activities.
c. Participate in Swatch Bharath and write an essay on the importance of the program
d. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.9 **Act in alignment with one's own values to contribute to one's life-long growth and learning.**

a. Physical activities such as sports, yoga, meditation and other relaxation techniques

(PO5, 6, 7, 8, 9, 10)

CO.10 Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.

a. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
b. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
c. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
d. Seminar on problems with possible solutions in the campus or nearby places

(PO5, 6, 7, 8, 9, 10)

CO	Outcome	CO/PO Mapping
CO1	Address the identified needs of the community collaboratively to facilitate positive social change.	5, 6, 7, 8, 9, 10
CO2	Listen attentively to others and respond appropriately	5, 6, 7, 8, 9, 10
CO3	Adapt your style to the occasion, task, and audience	5, 6, 7, 8, 9, 10
CO4	Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.	5, 6, 7, 8, 9, 10
CO5	Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations	5, 6, 7, 8, 9, 10
CO6	Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.	5, 6, 7, 8, 9, 10
CO7	Utilize others' ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others	5, 6, 7, 8, 9, 10
CO8	Ability to recognize their strengths and those of others to work towards a shared vision	5, 6, 7, 8, 9, 10
CO9	Act in alignment with one's own values to contribute to one's life-long growth and learning.	5, 6, 7, 8, 9, 10
CO10	Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.	5, 6, 7, 8, 9, 10

Note: The above COs may be mapped to other POs from 1 to 4 apart from PO's 5 to 10 depending on the topic

Suggested Student Activities

1. Prepare a chart related to the topics covered in the present semester.
2. Refer to an e-journal and submit a summary report on upcoming technologies.
3. Visit factory / industry and submit a report/PPT on the observations made.
4. Prepare a mini project and submit report.
5. Listen to expert talk, guest lecture, youtube video and write a summary.
6. Participate in Haritha Haram and submit a small report about the activities.
7. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
8. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
9. Participate in Swatch Bharath and write an essay on the importance of the program
10. Group discussions or enacting a play on topics creating awareness about socio-economic problems
11. Physical activities such as sports, games, yoga, meditation and other relaxation techniques
12. Participate in quiz on technical aspects or current affairs

13. Seminar on problems with possible solutions in the campus or nearby places
14. Participate in NCC
15. Participate in Mock interviews

Note: The above student activities will be assessed using rubrics. A sample rubrics template is given below. The subject teacher can assess students using rubrics with atleast four relevant aspects.

RUBRICS MODEL (For assessing Presentation skills)

Aspects	Needs improvement	Satisfactory	Good	Exemplary
Collection of data	Collects very limited information	Collect much Information with very limited relevance to the topic	Collects some basic information with little bit of irrelevance	Collects a great deal of information with relevance
Presentation of data	Clumsy presentation of data	Presents data well; but presentation needs to be more meaningful	Presents data well but need to improve clarity	Presents data in an understandable yet concise manner
Fulfill team's roles & duties	Performs very little duties but Unreliable.	Performs very little duties and is inactive	Performs nearly all duties	Performs all duties of assigned team roles
Shares work equally	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
Interaction with other team mates	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening to others	Listens, but sometimes talks too much	Listens and speaks a fair amount
Audibility and clarity in speech	Hardly audible and unclear	Very little audibility and clarity	Audible most of the time with clarity	Audible and clear
Understanding content	Lacks content understanding and is clearly a work in progress	Little depth of content understanding	Some depth of content understanding is evident but needs improvement	Insight and depth of content understanding are evident
Content Presentation	Content is inaccurate and information is not presented in a logical order making it difficult to follow	Content is accurate and information is not presented in a logical order making it difficult to follow	Content is accurate but some information is not presented in a logical order but is still generally easy to follow	Content is accurate and information is presented in a logical order

Suggested additional aspects for assessing Leadership Qualities:

1. Carrying self
2. Punctuality
3. Team work abilities
4. Moral values
5. Communication skills

6. Ensures the work is done in time

Suggested additional aspects for assessing "Participation in social task"

1 Interested to know the current situation of society.
2 Shows interest to participate in given social task.
3 Reliable
4 Helping nature
5 Inter personal skills
6 Ensures task is completed

Suggested additional aspects for assessing "Participation in Technical task"

1. Updated to new technologies
2. Identifies problems in society that can be solved using technology
3. Interested to participate in finding possible technical solutions to identified project
4. Reliable
5. Interpersonal skills

Suggested additional aspects for Carrying Self:

1 Stand or sit straight.
2 Keep your head level.
3 Relax your shoulders.
4 Spread your weight evenly on both legs.
5 If sitting, keep your elbows on the arms of your chair, rather than tightly against your sides.
6 Make appropriate eye contact while communicating.
7 Lower the pitch of your voice.
8 Speak more clearly.