LESSON PLAN: EEM WINTER 2022

Discipline: ELECTRICAL	Semester: WINTER 2022	Name of the teaching faculty: RAM PRASAD PANIGRAHI
Subject: Electrical Engineering Material	No of days/per week class allotted: 04	Semester From Date: 15/09/2022 To Date: 22/12/2022 No of weeks:14
Week:	Class day:	Theory/practical topics:
1st:	1ST	CONDUCTING MATERIALS: Introduction.
	2ND	Resistivity, factors affecting resistivity.
	3RD	To be continued.
	4TH	Classification of conducting materials into low resistivity and high resistivity materials.
2ND	1ST	Low Resistivity Materials and their Applications.
	2ND	To be continued.
	3RD	Stranded conductors.
	4TH	Bundled conductors.
3RD	1ST	Low resistivity copper alloys.
	2ND	High Resistivity Materials and their Applications.
	3RD	To be continued.
	4TH	Superconductivity.
4TH	1ST	Superconducting materials.
	2ND	Application of superconductor materials.
	3RD	SEMICONDUCTING MATERIALS: Introduction and Semiconductors.
	4TH	Electron Energy and Energy Band Theory.
5th	1ST	Excitation of Atoms.
	2ND	Insulators, Semiconductors and Conductors.
	3RD	Semiconductor materials. Covalent Bonds.
	4TH	Intrinsic Semiconductors. Extrinsic Semiconductors.
6th	1ST	N-type and P- type materials. Minority and Majority Carriers.
	2ND	Semiconductor Materials. Rectifiers and thermistors.
	3RD	Photoconductive and Photovoltaic cells. Varisters.
	4TH	Transistors, Hall effect generator and solar power.
7th	1ST	INSULATING MATERIALS: Introduction. Electrical properties of Insulating Materials.
	2ND	Visual and mechanical properties.
	3RD	Thermal and Chemical properties.
	4TH	Ageing.

8th	1ST	Introduction.
	2ND	Classification of insulating materials on the basis of physical and chemical structure.
	3RD	To be continued.
	4TH	Introduction to Insulating Gases. Commonly used Insulating Gases.
9th	1ST	Class test.
	2ND	DIELECTRIC MATERIALS: Introduction.
	3RD	Dielectric Constant of Permittivity.
	4TH	Polarization.
10th	1ST	Dielectric Loss.
	2ND	Electric Conductivity of Dielectrics and their Breakdown.
	3RD	Properties and Applications of Dielectrics.
	4TH	MAGNETIC MATERIALS: Introduction and Diamagnetism.
11th	1ST	Paramagnetism and Ferromagnetism.
	2ND	Magnetization Curve and Hysteresis.
	3RD	Eddy Currents, Curie Point and magneto- striction.
	4TH	Soft and Hard Magnetic Materials.
12th	1ST	MATERIALS FOR SPECIAL PURPOSES: Introduction. Structural Materials.
	2ND	Protective Materials.
	3RD	Thermocouple materials and bimetals.
	4TH	Soldering materials and fuse materials.
13th	1ST	Dehydrating material.
	2ND	Revision of important topics.
	3RD	To be continued.
	4TH	To be continued.
14th	1ST	To be continued.
	2ND	Class test.
	3RD	Practice test of PYQ.
	4TH	Practice test of PYQ.

Ram Prasad Panigrahi

Signature of the faculty

LESSON PLAN: CIRCUIT AND NETWORK THEORY WINTER 2022

Discipline: ELECTRICAL	Semester: WINTER 2022	Name of the teaching faculty: SHIBASHIS KAR
Subject: CIRCUIT AND NETWORK THEORY	No of days/per week class allotted: 05	Semester From Date: 15/09/2022 To Date: 22/12/2022 No of weeks:14
Week:	Class day:	Theory/practical topics:
1st	1st	1. MAGNETIC CIRCUITS Introduction Magnetizing force, Intensity, MMF, flux and their relations
	2nd	Permeability, reluctance and permeance Analogy between electric and Magnetic Circuits
	3rd	Series & parallel magnetic circuit.
	4th	Hysteresis loop(B-H Curve)
	5th	2. COUPLED CIRCUITS: Self Inductance and Mutual Inductance
2nd	1st	Conductively coupled circuit and mutual impedance Dot convention
	2nd	Coefficient of coupling Series connection of coupled inductors. Solve numerical problems
	3rd	Parallel connection of coupled inductors. Solve numerical problems
	4th	3. CIRCUIT ELEMENTS AND ANALYSIS: Active, Passive, Unilateral & bilateral, Linear & Non linear elements.
	5th	Mesh Analysis. Solve numerical problems
3rd	1st	Mesh Equations by inspection. Solve numerical problems
	2nd	Super mesh Analysis . Solve numerical problems
	3rd	Nodal Analysis. Solve numerical problems
	4th	Nodal Equations by inspection .Solve numerical problems
	5th	Super node Analysis. Solve numerical problems
4th	1st	Source Transformation Technique Solve numerical problems (With Independent Sources Only)
	2nd	Solve numerical problems with all techniques.
	3rd	4. NETWORK THEOREMS: Star to delta transformation. Solve numerical problems
	4th	Delta to star transformation. Solve numerical problems
	5th	Super position Theorem .Solve numerical problems
5th	1st	Thevenin's Theorem . Solve numerical problems
	2nd	Norton's Theorem. Solve numerical problems

	3rd	Maximum power Transfer Theorem. Solve numerical problems (With Independent Sources Only)
	4th	Solve numerical problems of all theorems.
	5th	Class test
6th	1st	5.AC CIRCUIT AND RESONANCE: A.C. through R-L series Circuit .Solution of problems of A.C. through R-L, R-C series Circuit by complex algebra method.
	2nd	A.C. through R-C series Circuit .Solution of problems of A.C. through R-L, R-C series Circuit by complex algebra method.
	3rd	A.C. through R-L-C series Circuit .Solution of problems of A.C. through R-L-C series Circuit by complex algebra method.
	4th	A.C. through R-L parallel Circuit Solution of problems of A.C. through R-L parallel Circuits
	5th	A.C. through R-C parallel Circuit .Solution of problems of A.C. through R-C parallel Circuits
7th	1st	A.C. through R-L-C parallel Circuit .Solution of problems of A.C. through R-L-C parallel Circuits
	2nd	A.C. through R-L-C parallel Circuit .Solution of problems of A.C. through R-L-C Composite Circuits
	3rd	Solve numerical problems of all types of circuits
	4th	Power factor & power triangle. Deduce expression for active, reactive, apparent power.
	5th	Derive the resonant frequency of series resonance circuit
8th	1st	Derive the resonant frequency of parallel resonance circuit
	2nd	Define Bandwidth, Selectivity & Q-factor in series circuit.
	3rd	Solve numerical problems of resonance.
	4th	6. POLYPHASE CIRCUIT Concept of poly-phase system and phase sequence
	5th	Relation between phase and line quantities in star & delta connection
9th	1st	Power equation in 3-phase balanced circuit. Solve numerical problems
	2nd	Measurement of 3-phase power by two wattmeter method. Solve numerical problems.
	3rd	Solve numerical problems of 3 phase circuits
	4th	7.TRANSIENTS: Steady state response.
	5th	Transient state response.
10th	1st	Response to R-L circuit under DC condition. Solve numerical problems
	2nd	Response to R-C circuit under DC condition. Solve numerical problems
	3rd	Response to RLC circuit under DC condition.Solve numerical problems
	4th	8.TWO-PORT NETWORK: Open circuit impedance (z) parameters Solve numerical problems.

	5th	Short circuit admittance (y) parameters Solve numerical problems
11th	1st	Transmission (ABCD) parameters Solve numerical problems
	2nd	Hybrid (h) parameters. Solve numerical problems
	3rd	Solve all types of parameters problems
	4th	Inter relationships of different parameters.
	5th	T representation. Solve numerical problems
12th	1st	π representation. Solve numerical problems
	2nd	9.FILTERS Define filter .Low pass filter ,high pass filter ,
	3rd	Pass Band filter , stop Band filter and cut-off frequency.
	4th	Constant – K low pass filter. Solve Numerical problems
	5th	Constant – K high pass filter. Solve numerical problems
13th	1st	Constant – K Band pass filter. Solve numerical problems
	2nd	Constant – K Band elimination filter. Solve numerical problems
	3rd	Solve numerical problems of filters
	4th	Class Test
	5th	Revision of chapters 1,2,3
14th	1st	Revision of chapters 4,5
	2nd	Revision of chapters 6,7
	3rd	Revision of chapters 8,9
	4th	Practice of test papers
	5th	Practice of test papers

Shibashis Kar

LESSON PLAN: CIRCUIT AND SIMULATION LAB WINTER 2022

Discipline: ELECTRICAL	Semester: WINTER 2022	Name of the teaching faculty: SHIBASHIS KAR
Subject: CIRCUIT AND SIMULATION LAB	No of days/per week class allotted: 06	Semester From Date: 15/09/2022 To Date: 22/12/2022 No of weeks:14
Week:	Class day:	Theory/practical topics:
1st	1st,2nd ,3rd	Measurement of equivalent resistance in series and parallel circuit
	4th ,5th,6th	Measurement of power and power factor using series R-L-C Load.
2nd	1st,2nd ,3rd	Measurement of power and power factor using series R-L-C Load.
	4th ,5th,6th	Verification of KCL and KVL.
3rd	1st,2nd ,3rd	Verification of Super position theorem
	4th ,5th,6th	Verification of Super position theorem
4th	1st,2nd ,3rd	Lab Records checking
	4th ,5th,6th	Verification of Thevenin's Theorem
5th	1st,2nd ,3rd	Verification of Thevenin's Theorem
	4th ,5th,6th	Verification of Norton's Theorem
6th	1st,2nd ,3rd	Verification of Norton's Theorem
	4th ,5th,6th	Verification of Maximum power transfer Theorem
7th	1st,2nd ,3rd	Verification of Maximum power transfer Theorem
	4th ,5th,6th	Determine resonant frequency of series R-L-C circuit.
8th	1st,2nd ,3rd	Determine resonant frequency of series R-L-C circuit.
	4th ,5th,6th	Lab Records checking
9th	1st,2nd ,3rd	Study of Low pass filter & determination of cut-off frequency
	4th ,5th,6th	Study of Low pass filter & determination of cut-off frequency
10th	1st,2nd ,3rd	Study of High pass filter & determination of cut-off frequency
	4th ,5th,6th	Study of High pass filter & determination of cut-off frequency
11th	1st,2nd ,3rd	Analyze the charging and discharging of an R-C & R-L circuit with oscilloscope and Compute the time constant from the tabulated data and determine the rise time graphically.
	4th ,5th,6th	Analyze the charging and discharging of an R-C & R-L circuit with oscilloscope and Compute the time constant from the tabulated data and determine the rise time graphically.
12th	1st,2nd ,3rd	Lab Records checking
	4th ,5th,6th	Construct the following circuits using P-Spice/MATLAB software and compare the measurements and waveforms. i. Superposition theorem ii. Series Resonant Circuit

		iii. Transient Response in R-L-C series circuit
13th	1st ,2nd ,3rd	Construct the following circuits using P-Spice/MATLAB software and compare the measurements and waveforms. i. Superposition theorem ii. Series Resonant Circuit iii. Transient Response in R-L-C series circuit
	4th ,5th ,6th	Lab Records checking
14th	1st ,2nd ,3rd	Revision of experiments
	4th ,5th ,6th	Practicing questions related to experiments

Shibashis Kar

Discipline: Electrical Engg.	Semester: 3rd	Name of the Teaching Faculty: Sri Anirudha Tarai
Subject: Elements of Mechanical Engg.	No. of days/ Week class allotted: 4	Semester From date: 15-09-2022 To Date: 22-12-2022 No. of Weeks: 15
Week	Class Day	Theory Topics
1st	1st	Set induction about the subject,objectives, question pattern
	2nd	Unit-1(THERMODYNAICS): Introduction,objective,definition of thermodynamics,Chalk board summary
	3rd	MILEY,State Unit of Heat and work, 1st law of thermodynamics,Chalk board summary
	4th	MILEY,State Laws of perfect gases,Chalk board summary
2nd	1st	MILEY,Determine relationship of specific heat of gases at constant volume and constant pressure,Chalk board summary
	2nd	MILEY,Assignments,Questions and Answers session
	3rd	Unit-2(PROPERTIES OF STEAM): Introduction,objective,definition of properties of steam, Chalk board summary
	4th	MILEY,Use steam table for solution of simple problem,Chalk board summary
3rd	1st	
	2nd	MILEY,Explain total heat of wet, dry and super heated steam,Chalk board summary
	3rd	MILEY,Assignments,Questions and Answers session
	4th	Unit-3(BOILERS): Introduction,objective,definition of Boilers,Chalk board summary
4th	1st	MILEY,State types of Boilers,Chalk board summary
	2nd	MILEY,describe Cochran boiler,Chalk board summary
	3rd	
	4th	MILEY,describe Babcock Wilcox boiler,Chalk board summary
5th	1st	
	2nd	MILEY,describe Mountings of a boiler, Chalk board summary
	3rd	MILEY,describe accessories of a boiler, Chalk board summary

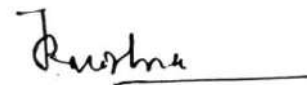|	4th	
6th	1st	MILEY,Assignments,Questions and Answers session
	2nd	Unit-4(STEAM ENGINES):Introduction,objective,definition of steam engine,Chalk board summary
	3rd	MILEY, explain the principle of Simple steam engine,Chalk board summary
	4th	
7th	1st	MILEY,draw Indicator diagram,Chalk board summary
	2nd	
	3rd	MILEY, Calculate Mean effective pressure, IHP and BHP and mechanical efficiency,Chalk board summary
	4th	
8th	1st	Solve Simple problem
	2nd	
	3rd	MILEY,Assignments,Questions and Answers session
	4th	Unit-5(STEAM TURBINES):Introduction,objective,definition, types,function of steam turbines,Chalk board summary
9th	1st	
	2nd	
	3rd	MILEY,differentiate between impulse and reaction Turbine
	4th	
10th	1st	MILEY,Assignments,Questions and Answers session
	2nd	Unit-6(CONDENSER):Introduction,definition of condenser,Chalk board summary
	3rd	MILEY,explain the function of condenser, Chalk board summary
	4th	MILEY,state their types of condenser, Chalk board summary
11th	1st	MILEY,Assignments,Questions and Answers session
	2nd	Unit-7(I.C. ENGINE):Introduction,definition of I.C Engine ,Chalk board summary
	3rd	MILEY,explain working of two stroke and 4 stroke petrol and Diesel engines.,Chalk board summary
	4th	MILEY,differentiate between them,Chalk board summary
12th	1st	MILEY,Assignments,Questions and Answers session
	2nd	Unit-8(HYDROSTATICS):Introduction,definition of hydrostatics ,Chalk board summary
	3rd	MILEY,describe properties of fluid, Chalk board summary

		4th	MILEY,determine pressure at a point, pressure measuring Instruments,Chalk board summary
13th		1st	Solve Simple problem
		2nd	MILEY,Assignments,Questions and Answers session
		3rd	Unit-9(HYDROKINETICS):Introduction,definition of hydrokinetics ,Chalk board summary
		4th	MILEY,deduce equation of continuity of flow,Chalk board summary
14th		1st	MILEY,explain energy of flowing liquid,Chalk board summary
		2nd	MILEY,state and explain Bernoulli's theorem,Chalk board summary
		3rd	MILEY,Assignments,Questions and Answers session
		4th	Unit-10(HYDRAULIC DEVICES AND PNEUMATICS):Introduction,definition,function of Hydraulic devices & pneumatics,Chalk board summary
15th		1st	MILEY,describe Intensifier of hydraulic device, Chalk board summary
		2nd	MILEY,explain hydraulic lift,Chalk board summary
		3rd	MILEY,explain accumulator & hydraulic ram, Chalk board summary
		4th	MILEY,Assignments,Questions and Answers session

Anirudha Tarai.

LESSON PLAN

DISCIPLINE	SEMESTER 3rd Sem.	Name of the Teaching Faculty: Jnyana Ranjan Mishra
Sub: EVS Th.5	No. of Days Per Week: 4 Class Allotted	Semester From Date: 15.09.2022 To Date: No. of Weeks: 15 Weeks
Week	Class Day	Theory/Practical Topic
1st	1	Definition, scope and importance, Need for public awareness.
	2	Natural resources and associated problems.
	3	Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
	4	Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
2nd	1	Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
	2	Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
	3	Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.
	4	Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.
3rd	1	Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity,
	2	Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity,
	3	Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
	4	Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.
4th	1	Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.
	2	Role of individual in conservation of natural resources.
	3	Equitable use of resources for sustainable life styles.
	4	Concept of an eco system.
5th	1	Structure and function of an eco system.
	2	Producers, consumers, decomposers.
	3	Energy flow in the eco systems.
	4	Ecological succession.
6th	1	Food chains, food webs and ecological pyramids.
	2	Introduction, types, characteristic features, structure and function of the following eco system:
	3	Forest ecosystem:
	4	Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).
7th	1	Introduction-Definition: genetics, species and ecosystem diversity.
	2	Biogeographically classification of India.
	3	Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
	4	Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
8th	1	Biodiversity at global, national and local level.
	2	Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.
	3	Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.
	4	Air pollution
9th	1	Air pollution
	2	Water pollution
	3	Water pollution

	4	Soil pollution
10th	1	Soil pollution
	2	Marine pollution
	3	Noise pollution
	4	Thermal pollution
11th	1	Nuclear hazards
	2	Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
	3	Role of an individual in prevention of pollution.
	4	Disaster management: Floods, earth quake, cyclone and landslides.
12th	1	Form unsustainable to sustainable development.
	2	Urban problems related to energy.
	3	Water conservation, rain water harvesting, water shed management.
	4	Resettlement and rehabilitation of people; its problems and concern.
13th	1	Environmental ethics: issue and possible solutions
	2	Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
	3	Air (prevention and control of pollution) Act.
	4	Water (prevention and control of pollution) Act.
14th	1	Public awareness.
	2	Population growth and variation among nations
	3	Population explosion- family welfare program
	4	Environment and human health
15th	1	Human rights.
	2	Value education
	3	Role of information technology in environment and human health.
	4	Role of information technology in environment and human health.

Signature of the teaching faculty

Discipline: Electrical Engg.	Semester: 3rd	Name of the Teaching Faculty: Sri Anirudha Tarai
Subject: Mechanical Workshop Practice	No. of days/ Week class allotted: 6	Semester From date: 15-09-2022 To Date: 22-12-2022 No. of Weeks: 15
Week	Class Day	Practical/Term work Topics
1st	1st,2nd,3rd	Safety precautions used in workshop
	4th,5th,6th	Introduction,objective & safety in a carpentry shop
2nd	1st,2nd,3rd	Name of carpentry tools and uses
	4th,5th,6th	Demonstrate safety practices in different operations :- Sawing,Planning,Chiseling
3rd	1st,2nd,3rd	
	4th,5th,6th	Measuring & Marking of a practice job
4th	1st,2nd,3rd	Record Submission & Viva voce
	4th,5th,6th	Demonstrate different types of timbers used by carpenters, substitutions of timbers
5th	1st,2nd,3rd	Preparation of Slot. Notch
	4th,5th,6th	Preparation of Mortise and tenon joint
6th	1st,2nd,3rd	
	4th,5th,6th	Preparation of Single dovetail joint
7th	1st,2nd,3rd	
	4th,5th,6th	Practice
8th	1st,2nd,3rd	Record Submission & Viva voce
	4th,5th,6th	Introduction,objective & safety in a Turning Shop
9th	1st,2nd,3rd	Study of S. C. Lathes and their accessories
	4th,5th,6th	
10th	1st,2nd,3rd	Record Submission & Viva voce
	4th,5th,6th	Practice in lathe work involving various operations such as plane turning, step-turning
11th	1st,2nd,3rd	
	4th,5th,6th	Practice a job
12th	1st,2nd,3rd	Practice in lathe work involving tapper turning operation
	4th,5th,6th	
13th	1st,2nd,3rd	Practice a job
	4th,5th,6th	Practice in lathe work involving knuckling and external V. Threading operation
14th	1st,2nd,3rd	
	4th,5th,6th	Practice a job
15th	1st,2nd,3rd	Record Submission & Viva voce
	4th,5th,6th	Grand Viva

Anirudha Tarai.

LESON PLAN: Winter semester- 2022

Department: **Electrical**	Semester: **Winter 2022**	Name of the teaching faculty: **Dambarudhar Patel**
Subject: **ME Lab**	No. of periods per week: **3**	Semester from date: **15/09/2022** to date: **22/12/2022** No of weeks: **14**

Week	Period	Topic to be covered
1st	1st	Determination of M.A.,V.R. and efficiency of Screw Jack
	2nd	Do
	3rd	Do
2nd	1st	Determination of friction co-efficient of bearing
	2nd	Do
	3rd	Do
3rd	1st	Determination of Young's modulus by Searle's Apparatus
	2nd	Do
	3rd	Do
4th	1st	Determination of M.A.,V.R. and efficiency of wheel train
	2nd	Do
	3rd	Do
5th	1st	Determination of Bending stress in beam using strain gauge
	2nd	Do
	3rd	Do
6th	1st	Study of Universal Testing Machine and determination of tensile stress and Young's module of M.S specification.
	2nd	Do
	3rd	Do
7th	1st	Study of pressure measuring devices such as (a) Piezo-meter (b)Simple manometer
	2nd	Do
	3rd	Do
8th	1st	Study of venturi-meter
	2nd	Do
	3rd	Do
9th	1st	Verification of Bernouli's Theorem
	2nd	Do
	3rd	Do
10th	1st	Model study of Centrifugal pumps, Francis, Turbine, Kaplanturbine and Pelton wheel
	2nd	Do
	3rd	Do
11th	1st	Study of Cochran Boiler Study of Cochran Boiler
	2nd	Do
	3rd	Do
12th	1st	Study and demonstration of Stream Engine
	2nd	Do
	3rd	Do
13th	1st	Study and demonstration of Diesel Engine
	2nd	Do
	3rd	Do
14th	1st	Study and demonstration of Petrol Engine
	2nd	Do
	3rd	Do

GOVT. POLYTECHNIC, KALAHANDI
LESSON PLAN (ENGG. MATHEMATICS III)

Discipline: Electrical Engg.	Semester: 3rd	Name of the teaching faculty: Ritu Biswal
Subject: Engg. Mathematics III (Th 1)	No. of days/week class allotted: 4	Semester from date: to date: No. of weeks: 14

Week	Class Day	Theory Topics
1st	1st	**1. Complex Numbers:** Real and imaginary numbers, definition of a complex number, conjugate of complex numbers, modulus of a complex number with examples
	2nd	Amplitude of a complex number, geometrical representation of a complex number with example
	3rd	Properties of complex numbers with examples
	4th	Determination of three cube roots of unity and their properties
2nd	1st	De-Moivre's theorem and problem solving
	2nd	Solving Problems on amplitude of a complex number and De-moivre's theorem
	3rd	**2. MATRICES :Recap** Definition of Matrix, row, column, order of a matrix, Types of matrices: a) Row matrix, b) column matrix, c) square matrix, d) unit matrix
	4th	Determination of rank of a matrix by elementary transformation, example
3rd	1st	Some more example of finding rank of a matrix by elementary transformation method, Consistency of linear system of equations, Rouche's Theorem, Procedure to test the consistency of linear system of equations of n unknowns.
	2nd	Examples on consistency test and solving system of equations, Solving system of linear homogeneous equations
	3rd	Solving problems, finding rank of a matrix
	4th	**3. Linear Differential Eqations:** Definitions: i) Linear differential equation, ii) Linear differential equation with constant coefficients iii) Homogeneous and non-homogeneous linear differential equation with constant coefficients, Operator D, Concept of C.F. and P.I.
4th	1st	General solution y=CF+PI. Rules for finding the CF: Case 1:- If roots are real and different, Case 2: if roots are real and repeated, some examples on these two cases
	2nd	Case 3: If one pair of roots be imaginary, Case 4: If two points of imaginary roots are equal, some examples on these two cases.
	3rd	Inverse operator, Rules for finding the Particular Integral (PI): Case 1: When $X=e^{(ax)}$, Case 2: when $X=\sin(ax+b)$ or $\cos(ax+b)$, some examples on these two cases
	4th	Solving problems on CF and PI

5th	1st	Case 3: when X=x^m, Case 4: when X=e^(ax)V, some examples on these two cases
	2nd	Working rule to find the Complete solution y=CF+PI, Examples
	3rd	Partial differential equation, formation of pde by eliminating arbitrary constants and arbitrary functions.
	4th	Examples on formation of pdes
6th	1st	Linear pde of 1st order, working rule to solve Pp+Qq=R, examples
	2nd	More problems on ODE and PDE.
	3rd	**4. Laplace Transforms:** Definition of Gamma function, reduction formula, example
	4th	Prove $\Gamma(\frac{1}{2}) = \sqrt{\pi}$, Short problems on reduction formula
7th	1st	Definition of Laplace transform of a function, inverse laplace transform, existence of laplace transform
	2nd	Derivation of laplace transform of standard functions: k, t^n, sin ax, cos ax, sinh ax, cosh ax.
	3rd	Properties of LT: i) Linearity property ii) First shifting property, and problems on these properties.
	4th	Change of scale property, examples on it
8th	1st	Formulation of LT of derivatives and integrals, some problems to solve
	2nd	Formulation of LT multiplication by t^n, division by t, examples
	3rd	Solving problems to find LT
	4th	Derivation of formula of inverse LT and problems on Inverse LT.
9th	1st	Some more problems on ILT.
	2nd	**5. Fourier series:** Definition of periodic function with example. Fourier series, Euler's formulae.
	3rd	**Establishment of some formulae:** $\int_{\alpha}^{\alpha+2\pi} cosnx \, dx, \int_{\alpha}^{\alpha+2\pi} sinnx \, dx,$ $\int_{\alpha}^{\alpha+2\pi} cosmx \, cosnx \, dx, \int_{\alpha}^{\alpha+2\pi} cos^2nx \, dx$
	4th	Dirichlet's condition for fourier expansion, example
10th	1st	Periodic function satisfying Dirichlet's condition as a fourier series with example
	2nd	Even function and its fourier series in $0 \le x \le 2\pi$ and $-\pi \le x \le \pi$. with example
	3rd	Odd function and its fourier series in $0 \le x \le 2\pi$ and $-\pi \le x \le \pi$. with example
	4th	Problems on even and odd function and fourier series expansion
11th	1st	f.s . of continuous function in $0 \le x \le 2\pi$ and $-\pi \le x \le \pi$.
	2nd	f.s. of functions having points of discontinuity in

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		$0 \le x \le 2\pi$ and $-\pi \le x \le \pi$.
	3rd	6. Numerical methods Limitation of analytical methods and need of numerical method, iteration formula
	4th	Bisection method and problem solving by this method
12th	1st	Solution by Newton-Raphson method
	2nd	Problems on Bisection method and Newton-Raphson method
	3rd	**7. Finite difference and interpolation** Finite difference , forward and backward difference table
	4th	Definition of shift operator, relation between operators
13th	1st	Newton's forward difference interpolation for equal intervals with examples
	2nd	Newton's backward difference interpolation for equal intervals with examples
	3rd	Lagrange's interpolation for unequal intervals with examples
	4th	Solving problems on Lagrange's interpolation
14th	1st	Problems on Lagrange's interpolation and Newton's forward difference interpolation
	2nd	**Newton –Cote's formula, Trapezoidal rule with example**
	3rd	Simpson's 1/3 rd rule with example
	4th	Problems on Trapezoidal rule and Simpson's 1/3 rd rule
15th	1st	Revision: Discussion of important questions of 2 marks
	2nd	Revision: Discussion of important questions of 5 marks
	3rd	Revision: Discussion of important questions of 10 marks
	4th	Revision: Discussion of previous year questions

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