KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University Established Under Section 3 of UGC Act 1956)

Coimbatore – 641 021

LECTURE PLAN
DEPARTMENT OF MATHEMATICS

STAFF NAME: P. VICTOR

SUBJECT NAME: MATHEMATICS-I SUB.CODE:19PHU103

SEMESTER: I CLASS: I B.Sc. Physics

S.No	Lecture Duration Period	Topics to be Covered	Support Material/Page No
		UNIT-I	
1	1	Different types of Matrices	S1:Ch.1:Pg.No:1-21
2	1	Continuation of Different types of Matrices	S1:Ch.1:Pg.No:1-21
3	1	Inverse of a Matrix	S1:Ch.1:Pg.No:37-40
4	1	Continuation of Inverse of a Matrix	S1:Ch.1:Pg.No:37-40
5	1	Cayley-Hamilton Theorem	S1:Ch.1:Pg.No:40-42
6	1	Continuation of Cayley-Hamilton Theorem	S1:Ch.1:Pg.No:40-42
7	1	Solution of Simultaneous Equations	S1:Ch.1:Pg.No:48-55
8	1	Continuation of Simultaneous Equations	S1:Ch.1:Pg.No:48-55
9	1	Recapitulation and Discussion of possible questions	
	Total No of Hours Planned For Unit 1=09		
		UNIT-II	
1	1	Concepts of Vector and Scalar fields	S3:Ch: . Pg.No:352-353
2	1	Derivative of a vector and the del operator	S3:Ch: . Pg.No:353-357
3	1	Directional Derivative	S3:Ch: .Pg.No:357-358
4	1	Gradient, Divergence of a vector	S3:Ch: .Pg.No:369-377
5	1	Continuation Gradient, Divergence of a vector	S3:Ch: .Pg.No:369-376
6	1	Formula for involving del operator and Laplacian operator	S3:Ch: .Pg.No:376-377

7	1	Curl of a vector	S3:Ch: .Pg.No:377-380
8	1	Continuation of Curl of a vector	S3:Ch: .Pg.No:377-380
9	1	Recapitulation and Discussion of possible questions	
	Total No of Hours Planned For Unit II=09		
UNIT-III			
1	1	Cauchy-Riemann Equations	S4:Ch.1:Pg.No:17-20
2	1	Continuation of Cauchy-Riemann Equation	S4:Ch.1:Pg.No:20-26
3	1	Polar form of Cauchy-Riemann Equation	S4:Ch.1:Pg.No:20-26
4	1	Analytic Function	S4:Ch.1:Pg.No:27-34
5	1	Continuation of Analytic function	S4:Ch.1:Pg.No:27-34
6	1	Properties of Analytic fucntion	S4:Ch.1:Pg.No:27-34
7	1	Milne-Thomson method	S4:Ch.1:Pg.No:34-42
8	1	Continuation of Milne-Thomson method	S4:Ch.1:Pg.No:34-42
9	1	Recapitulation and Discussion of possible questions	
	Total No of Hours Planned For Unit III=09		
UNIT-IV			
1	1	Differentiation	S2:Ch:2; Pg.No:24-36
2	1	Continuation of Differentiation	S2:Ch:2; Pg.No:37-39
3	1	Curvature in Cartesian Coordinates	S2:Ch:10; Pg.No:291-292
4	1	Radius of curvature in Cartesian and polar forms	S2:Ch:10; Pg.No:292-302
5	1	Continuation of Radius of curvature in Cartesian and polar forms	S2:Ch:10; Pg.No:292-302
6	1	Evolutes	S2:Ch:10; Pg.No:303-308
7	1	Continuation of Evolutes	S2:Ch.10; Pg.No:303-308
8	1	Involute	S2:Ch.10; Pg.No.309-310
9	1	Recapitulation and Discussion of possible questions	
	Total No of Hours Planned For Unit IV=09		

UNIT-V			
1	1	Methods of Integration	S2:Ch:1. Pg.No:6-7
2	1	Definite and Indefinite integrals	S2:Ch:1. Pg.No:7-14
3	1	Continuation of Definite and Indefinite integrals	S2:Ch:1. Pg.No:7-14
4	1	Integration by Substitution	S2:Ch:1. Pg.No:14-26
5	1	Continuation of Integration by Substitution	S2:Ch:1. Pg.No:14-26
6	1	Continuation of Integration by Substitution	S2:Ch:1. Pg.No:14-26
7	1	Integration by Parts	S2:Ch:1. Pg.No:74-78
8	1	Continuation of Integration by Parts	S2:Ch:1. Pg.No:74-78
9	1	Recapitulation and Discussion of possible questions	
10	1	Discuss on Previous ESE Question Papers	
11	1	Discuss on Previous ESE Question Papers	
12	1	Discuss on Previous ESE Question Papers	
	Total No of Hours Planned for Unit V=12		
Total Planned Hours			**48**

SUGGESTED READINGS

1. Aggarwal. S.M, year, “Business Mathematics & Statistics
2. Manickavasagam Pillai. T.K and Narayanan. S, 2002, “Calculus”, Vol.1 and Vol.2, S.V. Printers & Publishers, Chennai
3. Sastry S. S, 2009, “Engineering Mathematics”, PHI learning Pvt. Ltd, New Delhi.
4. Arumugam.S , Thangapandi Isaac A and Somasundaram A, 2000, “Engineering Mathematics”, Vol.2, SCITECH Publication Pvt.Ltd, Chennai.

QUESTION	OPT 1	OPT 2	OPT 3	OPT 4	ANSWER
A square matrix such that A = A^T is called----------	symmetric	Skew symmetric	Hermitilan	Scalar	Symmetric
I*A = ----------.	A	0	Identity matrix	Zero matrix	A
A square matrix A is an orthogonal matrix, if _____	AA^T = I	AA^T = - I	A= A^T	A= A^-1	AA^T = I
In matrix method, the simultaneous equation is of the form AX = C, then X =	AC	C	A^-1C	A^-1	A^-1C
The number of elements in an m x n matrix is ----------	mn	nm	m^2	m	mn
A square matrix is said to be singular if its determinant is --------	0	1	2	3	0
If the order of the matrix A is 4 x 5 and the order of the matrix B is 2 x 4 then the resultant matrix BA has the order ----------	2 x 4	4 x 4	4 x 5	2 x 5	2 x 5
[3 8 9 -2] is a row matrix of order----------	1 x 4	4 x 1	1 x 1	4 x 4	1 x 4
In a square matrix A, aij = 0 for i <j, then it is called a ---------- matrix.	lower triangular	diagonal	lower triangular	triangular	lower triangular
The condition for existing of A^{-1} is ----------	A is non singular	A is singular	A^T is singular	A square matrix	A is non singular
If every element of a row is zero the value of the determinant is ……	0	1	2	3	0
If A is a skew symmetric matrix, then A^T =……	A	-A	$\|A\|$	A^{-1}	-A
If |AB|≠0, then ([[AB]]^(-1)) is…….	A^(-1) B^(-1)	B^(-1) A^(-1)	0	none	B^(-1) A^(-1)
Matrix having same number of columns and rows is called……..	triangular	rectangular	square	null	square
Determinanent of an identity matrix is……..	0	1	2	3	1

If order of A is m×n and order of B is n×m then order of AB is --	m X n	mX m	nXn	1 X1	m X m
In matrix method, the simultaneous equation is of the form AX = C, then X=	AC	C	A^-1C	A^-1	A^-1C
A square matrix A is said to be ---------- matrix if A = A^T	. singular matrix	Skew symmetric	Symmetric	transpose matrix	Symmetric
The number of elements in an m x n matrix is ----------	mn	nm	m^2	m	mn
If A is given the A^-1 is…….	adj/|A|	|A|/adj A	adj A	none	adj A / |A|

QUESTION	OPT 1	OPT 2	OPT 3	OPT 4	ANSWER
Del^2 (r^m) is equal to----------	mr^m-1	m^2 r^m-2	m(m+1) r^m-2	(m+1) m r^m-1	mr^m-1
If r = 2xi -yj +2zk, then del r= ……..	0	4	3	2	3
Which of the following is a scalar function ?	del.A	del((Phi))	del (del.A)	del x A	del . A
delx (del x (Phi)) =	0	1	-1	3	-1
Grad (r^n) is…….	nr^(n-1)r(vector)	nr^(n-2)r(vector)	(n-1)r^(n-2)r(vector)	r^(n-1)r(vector)	nr^(n-2)r(vector)
The divergence of the position vector r is	1	2	r	3	1
The divergence theorem enables to convert a surface integral on a closed surface into a ------	line integral	surface integral	volume integral	zero	volume integral
The A(vector) = x^2z^2i(vector) + xyz^2(j)(vector)– xz^3k(vector) is……	Irrotational (vector)	Solenoidal (vector)	Zero (vector)	Position (vector)	Solenoidal (vector)
If A(vector) is irrotational , then……..	div (A(vector))=0	curl (A(vector)) =0	|A(vector)| = 0	div (curl(A(vector))) =0	curl (A(vector)) =0
The divergence of the vector xi(vector)+yj(vector)+zk(vector) is……	0	1	2	3	3
Curl of the gradient of a vector is …….	unity	null (vector)	Zero (vector)	undefined	Zero (vector)
A vector F(vector) is said to be irrotational if……	del(Phi)=0	curl (F(vector))=0	div (F(vector))=0	none of these	curl (F(vector))=0
Unit normal vector for a surface (Phi)(x,y,z)=……..	del(Phi)	|del(Phi)|	del(Phi)/|del(Phi)|	1/|del(Phi)|	del(Phi)/|del(Phi)|
The operator del^2 is a …….	scalar	(vector)	derivative	none of these	Scalar
Normal derivate for a surface (Phi)(x,y,z)=……..	del (Phi)	|del (Phi)|	del (Phi)/|del (Phi)|	1/|del(Phi)|	|del(Phi)|
Divergence of a vector is ……..	Scalar	(vector)	Curl	zero	Scalar
The curl of a vector is zero, then the vector is called ……	Solenoidal	Gradient	irrotational	divergence	irrotational
The Laplace operator is …….	del(Phi)	del^2	del	del^3	del^2

QUESTIONS	OPT 1	OPT 2	OPT 3	OPT 4	ANSWER
CR equations are……..	u_x=v_y and u_y=-v_x	u_x= -v_y and u_y=-v_x	u_x=0 and u_y=-v_x	u_x=v_y and u_y=0	u_x = v_y and u_y = - v_x
An analytic function with constant modulus is…….	Constant	not constant	analytic	None of these	Constant
A Milne – Thomson method is used to construct……..	analytic function	Continuous function	differentiable function	integral function	analytic function
A Continous function is differential……..	TRUE	FALSE	True & False	True or False	TRUE
A function phi(x, y) satisfying Laplace equation is called	Analytic	Holomorphic	Harmonic	Non-hormonic	Harmonic
A function f(z) = e^z is……	Analytic everywhere	Analytic nowhere	only differentiable	None	Analytic everywhere
If f(z)=u+iv in polar form is analytic then dhou/dhor is …….	dhov/dhotheta	r *dhov/dhotheta	1/r * dhov/dhotheta	0	1/r * dhov/dhotheta
A function f(z) is analytic if ……..	real part of f(z) is analytic	imaginary part of f(z) is analytic	both real and imaginary part of f(z) is analytic	0	both real and imaginary part of f(z) is analytic
If f(z)=u+iv in polar form is analytic then dhou/dhotheta is ……	- r (dhov/dhor)	r (dhov/dhotheta)	1/r *(dhov/dhotheta)	(dhov/dhotheta)	- r (dhov/dhor)
A function u is said to be harmonic if and only if …….	u_xx+u_yy=0	u_xx-u_yy=0	u_xy-u_yy=0	u_xx-u_xy=1	u_xx+u_yy=0
If f(z)=x+ay+i(bx+cy) is analytic then the constants a and b and c equals to …….	a=1 and c=-b	c=1 and a= -b	. 0 and 1 and 2	1 and 1 and 1	c=1 and a= -b
A point at which a function ceases to be analytic is called a …….	non-singular point	regular point	singular point	non regular point	singular point
If f(z)=u+iv in polar form is analytic then dhou/dhor is …….	dhov/dhotheta	r dhov/dhotheta	1/r* dhov/dhotheta	0	1/r* dhov/dhotheta
Hormonic conjugate of u(x,y) is ……	0	u(x,y)	v(x,y)	u+iv	v(x,y)
The complex function f(z)=…….	x+iy	u+iv	x-iy	u-iv	u+iv
Analytic function also called …….. function	entire	regular	constant	trigonometric	regular
f(z)= z bar is …….function	analytic	constant	not analytic	differentiable	not analytic
The value of i = ……	1	-1	√(-1)	0	√(-1)
A function u is harmonic if …….	del(u)=0	del^2 (u)=0	u=constant	u=0	del^2 (u)=0
Analytic function also called …….. function	entire	constant	holomorphic	trigonometric	holomorphic
If u and v are hormonic functions the f(z)=u+iv is…….	analytic function	Continuous function	differentiable function	integral function	analytic function
A function v is called conjugacte hormonic function for a hormonic function u in a domain when ever…….	u is analytic	v is analytic	f=u+iv is analytic	f=u-iv is analytic	f=u+iv is analytic
If e^ax*cosy is hormoinc then a is ……	0	-1	2	i	i
Hormonic conjugate of v(x,y) is……	v(x,y)	u(x,y)	u+iv	0	u(x,y)
If the imaginary part of an analytic f(z) is 2xy+y, then the imaginary part is……..	x^2-y^2-y	x^2-y^2+x	x^2-y^2-x	x^2-y^2+y	x^2-y^2+x
If the real part of an analytic function f(z) is x^2-y^2-y, then the imaginary part is……	2xy-y	2xy-x	2xy+x	2xy+y	2xy+x

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The curvature of a straight line is ----------	0	1	pi	infinity	0
What is the value of slope of tangent to the curve y=f(x)----------	tan(pi)	pi	sin(pi)	cos(pi)	tan(pi)
The parametric equation of circle is----------	x=rcos(theta) y=sin(theta)	x=cos(theta) y=sin(theta)	x=rcos(theta) y=rsin(theta)	x=cos(theta) y=rsin(theta)	x=rcos(theta) y=rsin(theta)
The curvature of a circle of radius r at any point is---------	r	r^2	1/r^2	1/r	1/r
Let f(x,y) be the implicit form of the given curve then dy/dx is----------	f_x/f_y	-f_x/f_y	0	f_y/f_x	-f_x/f_y
What is the radius of curvature of the curve x^2+y^2=49 at (0 0)----------	49	7	0	1	7
The radius of curvature value is ρ then the curvature value is----------	rho	rho^2	1/rho	0	1/rho
What is the value of dy/dx to the function x^3+y^3=3axy----------	(x^2-ax)/(y^2-ax)	(x^2-ay)/(y^2-ax)	- (x^2-ay)/(y^2-ax)	-(x^2-ax)/(y^2-ax)	(x^2-ay)/(y^2-ax)
What is the value of e^x+e^(-x) ----------	coshx	sinhx	2coshx	2sinhx	2coshx
of the following functions could be f(x)----------	ax+b	sinx	cosx	ax^2+b	ax+b
The radius of curvature at any point of the curve r=e^theta is ----------	2r	root(2+r)	2root2-r	r(root(2))	r(root(2))
What is the value of cos(npi) ----------	0	1	-1	(-1)^n	(-1)^n
The reciprocal of the curvature of a curve at any point is called ----------	circle	radius of curvature	circle of curvature	centre of curvature	radius of curvature
The centre of curvature of the curve y=x^2 at the origin is----------	(0 0)	(0 1/2)	(1/2 1)	(0 -1/2)	(0 1/2)
Let u=x^y then dow(u)/dow(y) is ----------	x^y	e^(ylogx) logx	e^ylogx	logx	e^(ylogx) logx
If f(x,y)=x^3+xyz+z, Find fx at(1 1 1) is--------	0	1	-1	3	3
The radius of curvature of the curve x^2+y^2=16 at (1 1) is ----------	16	1	2	4	4

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The curvature value of the circle in all points are ----------	0	equal	notequal	infinity	equal
The value of slope of tangent to the curve y=f(x)----------	dy/dx	x	dx/dy	dx	dy/dx
The parametric equation of probola y^2=4ax is ----------	x=at y=a	x=at y=at^3	x=at^2 y=at	x=at y=at^2	x=at y=at^2
What is the name of the curves x=a(theta+sin(theta)) y=a(1-cos(theta)) is----------	cardioid	astroid	cycloid	ellipse	cycloid
What is the name of the curves r=a(1-cos(theta)) is----------	cardioid	astroid	cycloid	ellipse	cardioid
If the equation x=rcos(theta) y=rsin(theta) is called----------	cartesian form	polar form	perametric form	implicit form	perametric form
If the equation x^3+3xy^2+5x^2+7y^2-6x=0 is called----------	quatertic form	polar form	perametric form	implicit form	implicit form
If the equation form only x and y varibles is called----------	cartesian form	polar form	perametric form	sperical polar	cartesian form
If the equation form only r and theta varibles is called----------	cartesian form	polar form	perametric form	sperical polar	polar form
What is the value of sinnπ where n belongs to the integers then----------	0	1	-1	infinity	0
What is the name of the curves r=a(1+cos(theta)) is----------	cardioid	astroid	cycloid	ellipse	cardioid
The curvature value is 1/row then the curvature value is----------	row	row^2	1/row	0	row
In the polar form, which is analogous to the origin---------	r	theta	pole	argument	
The radius of curvature of the curve in polar form is----------	(r^2+r1^2)^(3/2) /(r^2+2r1^2-rr2)	(r1^2+r1^2)^(3/2) /(r^2+2r1^2-rr2)	(r2^2+r2^2)^(3/2) /(r^2+2r1^2-rr2)	(r^2-r1^2)^(3/2) /(r^2+2r1^2-rr2)	(r^2+r1^2)^(3/2) /(r^2+2r1^2-rr2)
The center of curvature is ……. for all the points in curve.	equal	origin	not equal	(1,1)	not equal
What is the value of e^x-e^(-x) ----------	coshx	sinhx	2coshx	2sinhx	2sinhx

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The radius of curvature of the curve in cartesian form is ----------	((1+(dy/dx)^2)^3/2)/(d^2x/dx^2)	((1+(dy/dx)^2))/(d^2x/dx^2)	((dy/dx)^2)^3/2)/(d^2x/dx^2)	((1+(dy/dx)^2)^3/2)(dx/dx)	((1+(dy/dx)^2)^3/2)/(d^2x/dx^2)
The value of d/dx(c),where c is constant then----------	1	0	-1	infinity	1
The value of d/dx(x) is----------	0	1	-1	infinity	1
The value of d/dx(logx) is----------	x	1/x	x^2	0	1/x
The value of d/dx(e^x) is----------	1	e^x	e^-x	-e^x	e^x
The value of d/dx(a^x) is----------	a^xloga	a^x	loga	0	a^xloga
The value of d/dx(sinx) is----------	cosx	sinx	tanx	-cosx	cosx
The value of d/dx(cosx) is----------	cosx	-sinx	sinx	-cosx	-sinx
The value of d/dx(tanx) is----------	cosecx	tanx	(secx)^2	(cosecx)^2	(secx)^2
The value of d/dx(secx) is----------	secxtanx	tanx	secx	cosx	secxtanx
The value of d/dx(cosecx) is----------	cosecx	-cosecxcotx	cotx	sinx	-cosecxcotx
The value of d/dx(cotx) is----------	sec^2x	tanx	cosx	-cosce^2x	-cosce^2x
The value of d/dx(sinhx) is----------	coshx	sinhx	tanhx	-coshx	coshx
The value of d/dx(coshx) is----------	coshx	sinhx	tanhx	-coshx	sinhx
The value of d/dx(tanhx) is----------	sec^2hx	tanhx	coshx	cosce^2hx	sec^2hx
The value of d/dx(cothx) is----------	sec^2hx	tanhx	coshx	-cosce^2hx	-cosce^2hx
The value of d/dx(sechx) is----------	tanhx	-sechxtanhx	sechx	coshx	-sechxtanhx

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The value of integral dx/(x^2+a^2)is----------	tan^(-1)x	1/a tan^(-1)x	1/a tan^(-1)(x/a)	tanx	tan^(-1)x
The integral (sin(theta))d(theta) value is----------	sin(theta)	cos(theta)	tan (theta)	sec(theta)	cos (theta)
The integral(cos(theta))d(theta) value is----------	sin(theta)	-cos (theta)	tan (theta)	sec (theta)	sin (theta)
The integral (tan(theta))d(theta) value is----------	0	–log cos (theta)	log sin (theta)	sec(theta)	–log cos (theta)
Integral a to b value of f(x) = ----------	F(a)-F(b)	F(b)-F(a)	F(a)	F(b)	F(b)-F(a)
The value of the integral 0 to pi/6 for the function (cos^2 (x/2))is----------	π	π/12+1/4	0	π/2	π/12+1/4
The integral (cot(theta))d(theta) value is----------	0	logsin(theta)	sin(theta)	sec(theta)	logsin(theta)
The integral(cosec(theta))d(theta) value is----------	logtan(x/2)	tan(x/2)	logsin(x/2)	sin(x/2)	logtan(x/2)
The integral dx/x value is----------	x	x^2	logx	1/x^2	logx
Which is following rational algebric function-----	integral1/xdx	integralxdx	integralx^2dx	integral(x+1)dx	integral1/xdx
The integral dx/(x^2+a^2) value is----------	1/a tan^(-1)(x/a)	1/a tan^(-1)x	tan^(-1)x	tanx	1/a tan^(-1)(x/a)
The integral dx/(x^2-a^2) value is----------	1/a log(x-a)	1/a log((x-a)/(x+a))	log((x-a)/(x+a))	log((x+a)	1/a log((x-a)/(x+a))
The integral sin(theta)d(theta) value is----------	-sin(theta)	-cos(theta)	tan(theta)	sec(theta)	-cos(theta)
The value integral (f'(x))/(f(x)) dx is----------	logx	logf(x)	0	f(x)	logf(x)
The integral (sec(theta)tan(theta))d(theta) value is----------	sec(theta)	-cos(theta)	logsin(theta)	cos(theta)	sec(theta)
The integral (cosec(theta)cot(theta))d(theta) value is----------	sec(theta)	-cosec(theta)	logsin(theta)	tan(theta)	-cosec(theta)
The integral (coshx)dx value is----------	sinhx	coshx	sechx	tanhx	sinhx
The value of integral (sinhx)dx value is----------	sinhx	coshx	-coshx	tanhx	coshx

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The integral (x^n)dx,if n=-1then value is----------	sinx	cosx	logx	tanx	logx
The value of integral cf(x) dx is equal to----------	integralf(x)dx	cintegralf(x)dx	c^2integralf(x)dx	cintegraldx	cintegralf(x)dx
The value of integral (u+v)dx is equal to----------	integral udx - integral vdx	integral udx*integral vdx	integral udx +integral vdx	integral uvdx	integraludx+integralvdx
The value of integral (u-v)dx is equal to----------	integral udx- integral vdx	integral udx*integral vdx	integral udx+integral vdx	integral uvdx	integral udx-integral vdx
The value of integral f(ax+b)dx is equal to----------	integral f(x)dx	1/a(integralf(x)dx)	integralaf(x)dx	integraldx	1/a(integralf(x)dx)
The value of integral e^(ax+b)dx is equal to----------	1/a(e^(ax+b))	a(e^(ax+b))	1/a(e^(ax))	1/a(e^(b))	1/a(e^(ax+b))