

# HindPhotostat



## **Hind Photostat & Book Store**

Best Quality Classroom Topper Hand Written Notes to Crack GATE, IES, PSU's & Other Government Competitive/ Entrance Exams

## MADE EASY ELECTRONICS ENGINEERING

E.M.T By-V.S.R Suresh Sir

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

Visit us:-www.hindphotostat.com

Courier Facility All Over India (DTDC & INDIA POST) Mob-9311989030



## **HindPhotostat**



#### MADE EASY, IES MASTER, ACE ACADEMY, KREATRYX

ESE, GATE, PSU BEST QUALITY TOPPER HAND WRITTEN NOTES

MINIMUM PRICE AVAILABLE @ OUR WEBSITE

1. ELECTRONICS ENGINEERING

2. ELECTRICAL ENGINEERING

**3.MECHANICAL ENGINEERING** 

4. CIVIL ENGINEERING

**5.INSTRUMENTION ENGINEERING** 

**6. COMPUTER SCIENCE** 

#### IES, GATE, PSU TEST SERIES AVAILABLE @ OUR WEBSITE

- **❖ IES-PRELIMS & MAINS**
- **GATE**
- > NOTE;- ALL ENGINEERING BRANCHS
- > ALL PSUs PREVIOUS YEAR QUESTION PAPER @ OUR WEBSITE

#### **PUBLICATIONS BOOKS -**

MADE EASY, IES MASTER, ACE ACADEMY, KREATRYX, GATE ACADEMY, ARIHANT, GK

RAKESH YADAV, KD CAMPUS, FOUNDATION, MC-GRAW HILL (TMH), PEARSON...OTHERS

HEAVY DISCOUNTS BOOKS AVAILABLE @ OUR WEBSITE

F230, Lado Sarai New Delhi-110030 Phone: 9311 989 030 Shop No: 46 100 Futa M.G. Rd Near Made Easy Ghitorni, New Delhi-30 Phone:9711475393 F518 Near Kali Maa Mandir Lado Sarai New Delhi-110030 Phone: 9560 163 471 Shop No.7/8 Saidulajab Market Neb Sarai More, Saket, New Delhi-30

Website: <a href="www.hindPhotostat.com">www.hindPhotostat.com</a>
Contact Us: 9311 989 030
Courier Facility All Over India
(DTDC & INDIA POST)

SYLLABUS :-

- PROBLEMS THEORY
- 1) Static Electromagnetic Fields (Hayt and Buck); sadiku; schaum Series
- 2) Jime Varying fields -> Electro-Magnetic Wavel. (JORDAIN BALMAIN).
- 3) Transmission Lines -> Voltage and whent waves (JOHN D RYDER).
  - 4) Maveguides (JORDAN BALMAIN).
  - 5) Antennas and Radiated waves. (JORDAN BALMAIN).

## Methodology of Preperation:

- 1) Concepts/Thewy/Fundamentals.
- 2) Application / Ouestioning style.
- 3) Beyond classroom h frevious Papers—(Gate/ESE).

VSRS 22@gmail.com

facebook ID

ysr suresh.

### TEXT BOOK :-

- 1) HAYT & BUCK.
- 2) SADIKU.

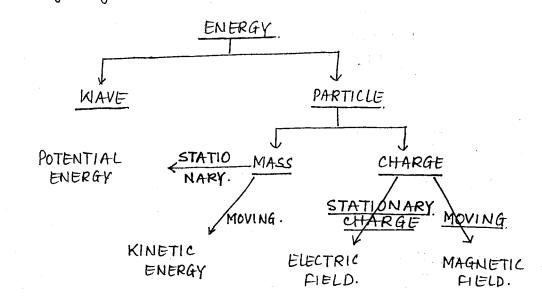
- 3) JOHN D RYDER.
- 4) JORDAN BALMAIN.

#### SESSION 1:

- L. Vector calculus.
  - \* Vector function
  - \* Density/Intensity funct
- 2. co-ordinate Systems
  - \* dl, ds, do
  - \* () Pot
  - \* (x) B Cross.

#### \*DEPINITION OF PIELD.

\* Everything in this world is ENERGY.



#### ELECTRIC FIELD!

\*Electric field is a format of Energy that is all around a charge Nole: Electric field cannot be and influences similar charges nearby been but can be feet by a test charge when brought in its vicinity.

#### MAGNETIC FIELD!

\*Magnetic field is a format of Energy that is all around a moving charge and influences similar moving charges nearby

Nole: Magnetic field cannot be seen but can be felt

1) Stationary Charge -> VOLTAGE (D.C Voltage) by another moving charge.

ELECTRIC FIELD (EFFECT)

#### Nole :.

\*When voltages are given to the Conductors, materials then the effect is seen in the free space.

\*Voltages to Conductors, moterials (2D).

Letters the certer space (free space) (3D).

Signals in 3D space

2) Moving charge --- DC CURRENT CAUSE MAGNETIC FIELD. (EPFECT)

Nole!

\* when current is given to the Conductor, materials it will give the cause in the free space and that is 3D space.

₩

**( )** 

◍

₩ 

₩

◍

₩

\* Current or Voltage given to Antenna hence felt in free space

### VECTOR CALCULUS :.

\*It is the study of DIRECTIONAL INTEGRATIONS and DIRECTIONAL DERIVATIVES in 3 DIMENSIONAL SPACE.

### DIRECTIONAL INTEGRATION :.

\*It is calculation of the total effect of any phenomenon in a given direction in a given region.

\*This can be implemented over a line, over a surface or over a Volume. 12

Id -> Une Integral. SJdS → Susface Integral. SSSdV -> volume Integral.

### DIRECTIONAL DERIVATIVE:

\* Directional derivative is the study of RATE OF CHANGE of any phenomenon in a given direction in a given region.

\* Helps in the study of Rate of flow. \* Helps in understanding the nature of variation of any phenomenon.

\* DEL OPERATOR is used for study of spatial variations in 3D of space. It is a vector operator.

Mathematically,

 $\nabla = \frac{\partial}{\partial x} q_{\chi} + \frac{\partial}{\partial y} q_{\chi} + \frac{\partial}{\partial z} q_{\chi} + \frac{\partial}{\partial$ 

\*It can be used to study the Rate of change of: 1) Scalar. Quantities. 2) Vector Quantities. \* Examples are :. 1) f(x,y,3) = 4x2y - 5z3 < Scalar Quantity. 2) Ā(x,4,3)(x,4,3) = 4x2yax +7yay +12x3az Vector Quantity. Mag. depends direction depends on (X, Y, 3) on (X, Y, 3) 3) A(Q)y = (1x) ay mag depends on x. direction depends on Y. \* GRADIENT !. \* V -> operated on scalar function in Vf \*\* Gradient of Scalar -> Result is Vector function \* DIVERGENCE AND CURL :. \* V operated on Vector function is called as: i) Divergence -> Dot product 2) Curl " -> cross Product. \* Divergence of Vector given as V.A. The Rescut is a Scalar. \* curl of Vector given as VXA. The Result is Vector. Mathemati cally Dot product 1) V. A = Direigence of Vector Result of operation is SCALAR. 2) VXA = cross product = curl of Vector Result of operation is Vector

Nole:

\* V. V = V2 = Second order decirative. + called as scalar LAPLACIAN

operator.

₩

Vector Identity!

$$1) \nabla x \nabla f = \nabla x (\nabla f) = 0$$

und of Gradient of Scalar =0

2) 
$$\nabla \cdot (\nabla x A) = 0$$

Divergence of curl of Vector = 0

NOR : AXB = C

CI (A OF PB)

Hence, Axc= |A||c| sin 90° n - IAIICI A

A · C = AC C0390°

 $A \cdot (A \times B) = 0 \cdot \Rightarrow \nabla \cdot (\nabla \times A) = 0 \cdot$ So,

Nole !.

AXB= | Al Bl Smo n. A.B = |A||B|COSA

\* VXV = 0; since both are same vectors and moving in same direction as like AXA.

VXV = 10/10/8mon =0

So, (V x Vf) =0

\* HAD, SIX +10; Single by are HOWIFE YOUND AND ONDING IN way direction.

\* TXA results in a vector I to both vand A. Hence

> V·(VXA) = ₹ V·B B=(VXA) and BIA

SO, V.B= |V||B| Cos 90° =0.

 $\nabla x(\nabla xA) = \nabla(\nabla \cdot A) - \nabla^2 A$ 

Note:

1.  $\nabla \times (\nabla \cdot A)$  \rightarrow not allowed. Since curl of Scalar is not 2.  $\nabla (\nabla \times A)$  \rightarrow not allowed. Vector is not allowed.

3.  $\nabla (\nabla \cdot A) = \nabla^2 A$ 

X440,040	
	*OUTFLOW & DIVERGENCE OF VECTOR FUNCTION!
	a source having some effects radially
	*Consider a cause or a source, having soone effects radially
	outward from the cause for all such phenomenon the STRENGTH
	decreases as the AREA OF EXPANSION Increases; such that:
	"The TOTAL OUTFLOW, through any enclosing surface is
	always a CONSTANT, and this constant depends on the
	. 17.1 001130
	with abandh represents a DENSITY VECTOR PONCTION
	of the lines; and mathematically Constant a cause Constant a cause
	ctrenath = Constant = cause   Constant & Cause
	strength = Constant = cause   Constant a cause   Area
	and it of a conjumbs of change, the effect represents, the
	If a trust a tractive or rebulsive force on any change nearby. This
	physical activities of Electric field.
	* If a cause is of a contombs of change, the effect represents, the Physical attractive or repulsive force on any change nearby. This is caused as Electric flux or electric field.
	CAICE OR SOURCE - 18
	EFFECT : Electric Force/Field/Flux (4e)
	STRENTH OF : Electric flux Dennity (D)  EFFECT  Dencity (D) such
	as Electric Flux Density (D) such
	*The strength is cause called as Electric Flux Density (D) such  Note: The effect around the
	$-\frac{1}{2}$
	field and can be feet by test charge and is not
	closed Visible
	\$ B.d3 = Q. GAUSS LAW IN INTEGRAL FORM.
	closed
	ausea
	Note:
	*9f the susface is not completely enclosing, the effects are Partial
	ie Handigh the
	If D.ds = Ye + flux Passing through the ourface (open), only through that
	open sugar and this is not
	GAUSS LAW.

\* Every closed Surface is Identified with a finite volume enclused.

1) 
$$4\pi r^2 \xrightarrow{\text{Sphere}} \frac{4}{3}\pi r^3$$

\* Mathematically,

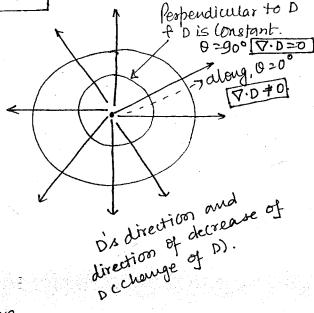
Strength of field, 
$$\vec{D} = \frac{d\Omega}{ds} \neq coulombs/m^2$$
.

$$* \frac{d0}{dv} = \frac{d}{dt} \left( \frac{d0}{ds} \right)$$

So, 
$$\frac{dQ}{dv} = \frac{d}{dt} \left( \frac{dQ}{ds} \right) = \nabla \cdot D$$

$$J_V = \nabla \cdot D$$

Direigence at any point depends on the volume change density



◍

\* The DOT (1) operation in derivative signifies the directional derivative in the vector direction.

Note:

\*The significance of Dot product is that, to understand the Rate of change of D, we have to read it along D. The surface given above are 1 to Dittence 02903 V.D20

(D)X-ELECTRIC FLUX \*Rale of change of strength depends on change density. (V.D=Pv)

Course! O > Effect = D or E.

change, Q.

\* V.D - Represents rate of change of effect \*helps in understanding the cause. \* by finding Pr, change stored in the volume helps in understanding the