WHAT IS A MNEMONIC?

A Mnemonic is an easy learning trick to memorise something complex.

Mnemonics help you to remember concepts for a long time.

During your exam, these Mnemonics will prove very useful to recollect concepts quickly and easily.

This is one more cognitive learning tool that fulfils our aim of 'Making Learning Simple' for you.

Each unit is picked from your syllabus. A concept is identified from it and relevant Mnemonics are developed for it by the "Oswaal Editorial Board".

Descriptions are also provided for each Mnemonic for clarity.

M. N. E. M. O. N. I. C.

Making a Nice and Easy, Memorable, Optical 'N' Illustrative representation of Concepts

PHYSICS

Class - 11, Unit-I

Physical World

Good **W**orkers **w**ork **f**or **E**xtended **S**ession.

Strength wise arrangement of fundamental forces in ascending order : **G**ravitation < **W**eak Nuclear force < **E**lectromagnetism < **S**trong Nuclear force

Class - 11, Unit-II

Motion In A Straight Line

Delhi **t**o **V**adodara **v**ia **T**undla **A**gra.

Displacement/**t**ime = **V**elocity

Velocity / **t**ime = **a**cceleration

Class - 11, Unit-III

1.(a) Newton's Laws of Motion

Newton, Newton don't kick cow
She may move ahead little bit now*
Newton hears her MAAA sound**
Cow gives Newton a kick
rebound***

* Newton's 1st law. A body continues its state of rest or state of motion unless it is acted upon by an unbalanced force.

** Newton's 2nd law F = ma

*** Newton's 3rd law : Every action has its equal and opposite reaction

Interpretation :

1st two lines of the rhyme depicts the 1st law of motion

3rd line depicts the 2nd law of motion

i.e. F = m × l

Lat the depicts the 3rd law of motion

1.(b) Motion In A Straight Line

A will be **I**, when 0 is close to **T**

Replace the "Δ" simply with "d"

Average Velocity = ΔD/ΔT

$$\lim_{\Delta T \to 0} \frac{\Delta D}{\Delta T} = \text{Instantaneous velocity} = dD/dT$$

Average Acceleration = ΔV/ΔT

$$\lim_{\Delta T \to 0} \frac{\Delta V}{\Delta T} = \text{Instantaneous velocity} = dV/dT$$

Class - 11, Unit-IV

Work, Energy And Power

Fernandez **d**'souza **o**rdered **n**oodles, **b**ut **w**as **s**erved **p**izza **a**nd **p**izza **w**as **a** **z**est.

If **f**orce and **D**isplacement are in **o**pposite direction, then work done is **n**egative.

If **f**orce and **D**isplacement are in **s**ame direction, then work done is **p**ositive.

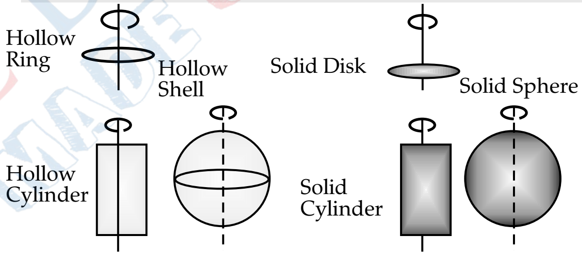
If force and Displacement are **p**erpendicular to each other, then **w**ork done is **z**ero.

Class - 11, Unit-V

Motion Of System Of Particles & Rigid Body

How **r**hino **c**ame **s**wift? **S**ince **d**ino **c**ame **s**low.

Write $2MR^2$ under each figure and then divide by 2, 3, 4, 5 respectively.



Class - 11, Unit-VI

Kelper's Laws of Planetary motion :

Take **E**ssential **F**oods **E**veryday **2/3** **T**imes

1st Law: Planets move in **elliptical** orbits

Sun is at one of **foci** of the orbit

2nd Law: A planet covers the **equal** area of space in **equal** interval of time no matter where it is in its orbit

3rd Law: Square of the **Time-period** of the planet is proportional to the cube of the semi major axes of the orbit. $T^2 \propto R^3$

Interpretation:

Letter E and F of Essential Food represents "Elliptical" and "Foci".

1st Law : Planets move in **elliptical** orbits with Sun at one of the foci.

Letter E of the word Everyday represents "Equal":

2nd Law : A planet covers the equal area space in equal interval of time no matter where it is in its orbit.

2/3 and T of the last two words represents the "power of Time Period" and "power of semi-major axis:

3rd Law :

Square of the Time-period of the planet is proportional to the cube of the semi major axes of the orbit.

$T^2 \alpha R^3$.

Class - 11, Unit-VII

1. Mechanical Properties Of Solid

Young **R**avi **b**ought **a** **p**en.

(1) Relation between **Y**, **B** and σ : (write Y and B(1+ σ) with coefficients and an equal sign in between. 1Y = 3B (1 + σ)

To find the coefficient of σ, refer the anti-clock circle, subtract the coefficients of B from coefficient of Y i.e. 1 – 3 = -2

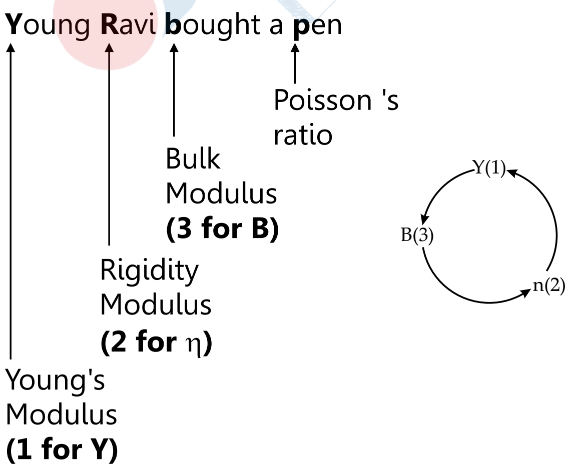
So, the relation is 1**Y** = 3**B** (1 - 2σ) or, **Y** = 3**B** (1 - 2σ)

(2) Relation between **Y**, η and σ : (write **Y** and η(1+ σ) with coefficients and an equal sign in between.

1**Y** = 2η (1 + σ)

To find the coefficient of σ, subtract the coefficient of **Y** from coefficient of η i.e. 2 – 1 = 1

So, the relation is 1**Y** = 2η (1 + σ) or, **Y** = 2η (1 + σ)



2. Thermal Properties of Matter

Fingers **we** **h**ave **f**ive
Cats **h**ave **n**ine **l**ives.
With **160** **m**ore
Cat **will** **h**elp **y**ou **s**ure!

Fingers we have five → 5F
Cats have nine lives. → 9C
With 160 more → 9C + 160
Cat will help you sure! → 5F = 9C + 160

Class - 11, Unit-VIII

Thermodynamics

Temperature, **V**olume, **P**ressure **N**o **H**eat **i**s **t**ransferred

Constant **t**emperature → Isothermal process
Constant **v**olume → Isochoric process
Constant **p**ressure → Isobaric process
No **h**eat **t**ransferred → Adiabatic process

Class - 11, Unit-IX

Behaviour of Perfect Gas & Kinetic Theory

Degrees of freedom :
Baa Baa Black Sheep
Have you any wool?
Yes sir, **M**om has **3** bags full.
Dadi needs **5** bags **n**ormally cool
Papa keeps **6** bags **n**ormal rule.
Papa, **D**adi each needs **2** bags more
High **c**old whenever, be very sure.

Mom has **3** bags full → Degrees of freedom of Monoatomic gas is 3.

Dadi needs **5** bags **n**ormally cool

Degrees of freedom of diatomic gas at normal → (room) temperature is 5.

Papa keeps **6** bags **n**ormal rule → Degrees of freedom of Polyatomic gas at normal (room) temperature is 6.

Papa, **D**adi each needs **2** bags more → Degrees of freedom of Polyatomic gas at high temperature is 6+2=8.

High cold whenever, be very sure → Degrees of freedom of Diatomic gas at high temperature is 5+2=7.

Class - 11, Unit-X

Waves

Teacher **P**unished **L**azy **D**og.

Particle oscillation in **T**ransverse wave → **P**erpendicular to the direction of propagation of wave

Particle oscillation in **L**ongitudinal wave → In the **d**irection of propagation of wave

Class - 12, Unit-I

Electric Charge & Field

Equally **d**ivide **c**ost **p**er **a**nnum.

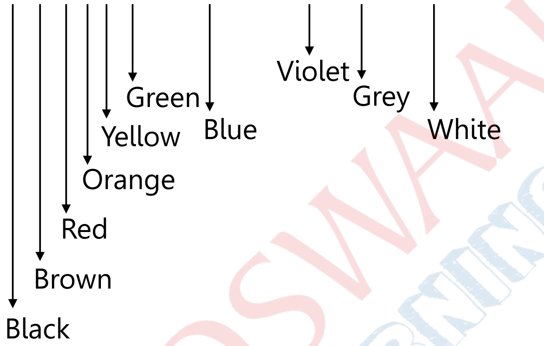
To find **e**lectric field, **d**ivide the **c**harge (enclosed) by the free space **p**ermittivity and **a**rea of the Gaussian

Class - 12, Unit-II

Resistor colour code :

0 1 234 5 6 7 8 9

B B ROY GOES **B**ERLIN **V**IA **G**OA **W**ALTAIR.



Interpretation :

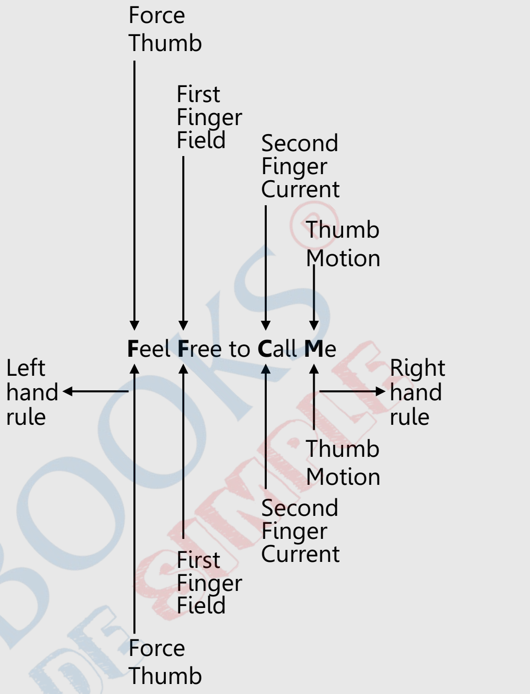
Colour codes of carbon resistors :

Colour	Corresponding number
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Berlin	6
Violet	7
Grey	8
White	9

Class - 12, Unit-III

Moving Charge And Magnetism

Fleming's left and right hand rule:



In Fleming's left hand rule, Thumb indicates FORCE.

In Fleming's left hand rule, Thumb indicates MOTION.

In both rules, first finger indicates FIELD and second finger indicates CURRENT

Class - 12, Unit-IV

Alternating Current

Calcutta **C**ity **V**ery **L**ovely **a**nd **V**ery **C**ongested

For **c**apacitive circuit → **C**urrent leads **V**oltage

For **i**nductive circuit → **v**oltage leads **c**urrent

Class - 12, Unit-V

Electromagnetic Waves

Russian **M**agician **s**howed **a**n **I**nteresting **V**ery **U**nusual **X**-ray **e**ye **G**ame

Electromagnetic waves with increasing frequency (decreasing wavelength) is in the order of:

(a) **R**adio wave

(b) **M**icrowave

(c) **I**nfrared

(d) **V**isible light

(e) **U**ltraviolet

(f) **X**-Rays

(g) **G**amma Rays

Class - 12, Unit-VI

(a). Ray Optics & Optical Instruments

M means M**ORE i.e**
Mirror Formula

M means **MORE** i.e+

So, $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$

Magnification will be of opposite sign :

So, $m=-\frac{v}{u}$

Particle oscillation in Transverse wave → Perpendicular to the direction of propagation of wave

Particle oscillation in Longitudinal wave → In the direction of propagation of wave

(b). Ray Optics & Optical Instruments

L means M**ORE i.e**
Lens Formula

L means **LESS** i.e–

So, $\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$

Magnification will be of opposite sign :

So, $m=+\frac{v}{u}$

Particle oscillation in Transverse wave → Perpendicular to the direction of propagation of wave

Particle oscillation in Longitudinal wave → In the direction of propagation of wave

Class - 12, Unit-VII

Einstein's equation of Photoelectric effect :

W E Unite to form **P**eople

Photon energy

Add

Energy of electron emitted

Work Function

Energy of emitted electron + Work function = Energy of incident Photon

Interpretation :

E + φ = hf

Or, E = hf = φ

Class - 12, Unit-VIII

(a). Atom : Hydrogen Spectra

Papa **b**rings **P**astry **f**or **B**abu **a**nd **L**al

When ni = 1, the series is **L**yman

When ni = 2, the series is **B**almer

When ni = 3, the series is **P**aschen

When ni = 4, the series is **B**rackett

When ni = 5, the series is **p**-fund

(b). Atom : Hydrogen Spectra

1 is **U**nimportant, **2** is **V**ery **i**mportant **a**nd **r**est **a**re **I**mportant

If ni = 1, i.e. Lyman series is in **UV** range.

If ni = 2, i.e. Balmer series is in **VIS**IBLE range.

If ni = 3, 4 and 5, i.e. Paschen series, Brackett series and p-fund series are in **IR** range

(c). Isotope, Isobar, Isotone

ISO **T**ope **B**ar **T**one

TOPE — P i.e numbers of PROTONs are same and numbers of NEUTRONs different

ISO—BAR — No P No N i.e. both PROTONs and NEUTRONs differ in number (Total remains same.)

TONE — N i.e. numbers of NEUTRONs are same and numbers of PROTONs different

In isotopes, numbers of protons are same. Numbers of neutrons are different.

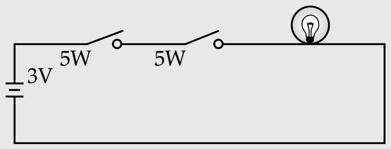
In isotones, numbers of neutrons are same. Numbers of protons are different.

In isobars, numbers of neutrons are different. Numbers of protons are also different. But the total nucleons remain same.

Class - 12, Unit-IX

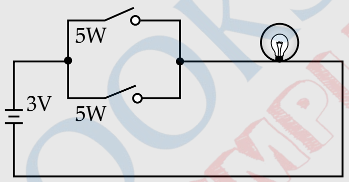
Electronic Devices

Truth **t**able of **A**ND and **OR g**ate



For AND gate, when both the switches are ON, then only the bulb is ON.

i.e. When both the inputs are 1, then only output is 1. Otherwise the output is 0.



For OR gate, when both the switches are OFF, then only the bulb is OFF.

i.e. When both the inputs are 0, then only output is 0. Otherwise the output is 1