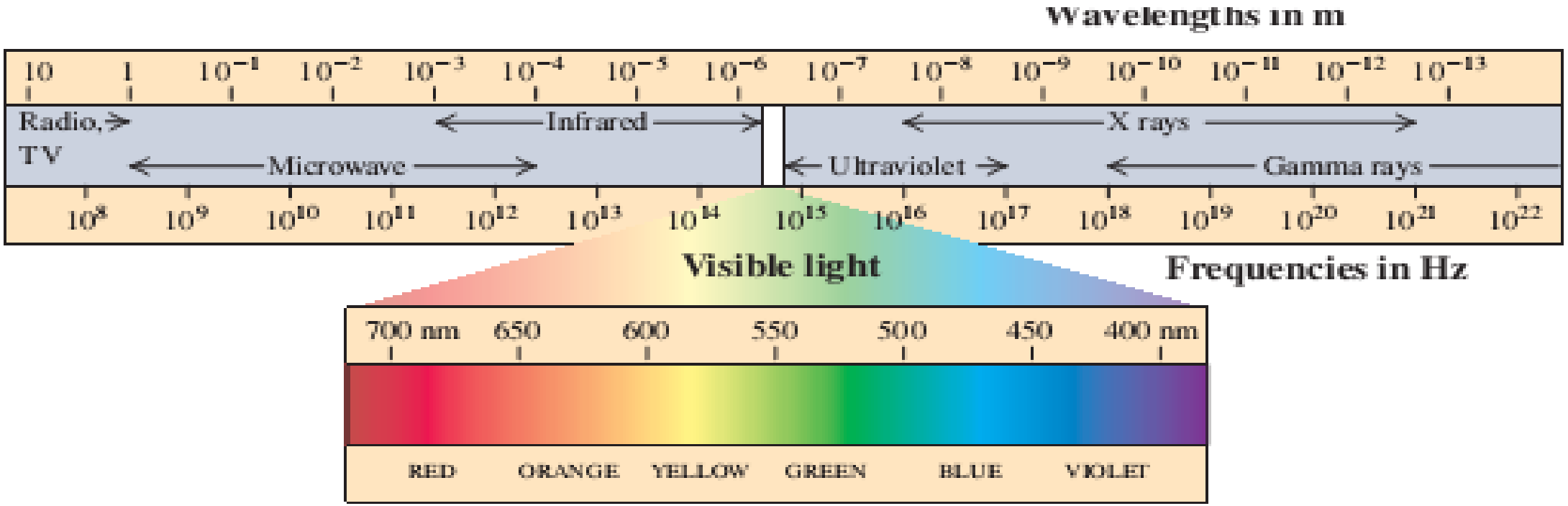
PHYS 102- GENERAL REVIEW
Identifying Equations: OPTICS

1) This diagram is called the **Electromagnetic Spectrum**



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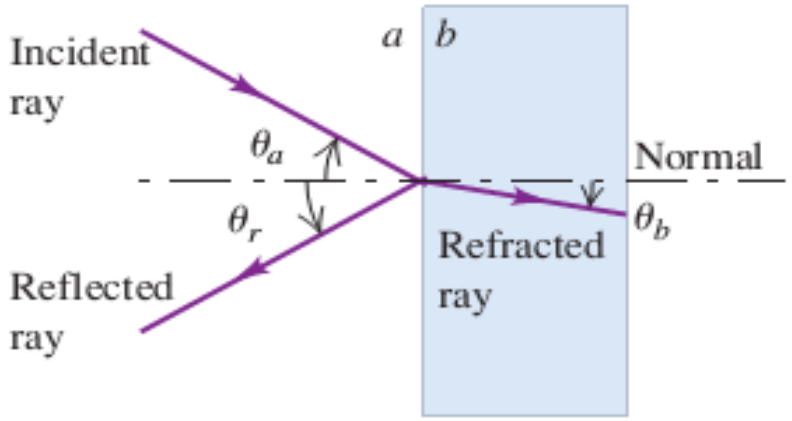
2) Electromagnetic radiation travels in vacuum at what speed? $3 \times 10^8\ m/s$

3) In the diagram below, if the angle of incidence is 60˚, what is the angle of reflection? 60˚



4) If light is passing from air-glass in the diagram above, what will be the angle of refraction? 34.73˚

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Identifying Equations: OPTICS

5) What's the mathematical equation expressing the relationship between frequency, wavelength and speed of light?

$$f = \frac{c}{\lambda}$$

6) Identify the refractive index of the following material.

Substance	Index of Refraction
Glass	1.52
Water	1.33
Air	1.0

7) How will you calculate the speed of light in an optical material?

$$n = \frac{c}{v}$$

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8) What is the mathematical expression for the Snell's Law? $n_a sin\theta_a = n_b sin\theta_b$

9) Is the critical angle same as the angle of incidence? Yes

10) So, what's the critical angle? When the angle of refraction is 90°, the incidence angle becomes critical

11) When the angle of refraction exceeds 90°, what happens? Total Internal Reflection

12) What's the mirror equation in relation to the radius of curvature? $\frac{1}{u} + \frac{1}{v} = \frac{2}{R}$

13) What's the mirror equation in relation to the focal length? $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

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14) The mathematical expression for finding the lateral magnification for a plane mirror is: $m = \frac{v}{u}$

15) If m is (–ve), this represents **that the image is inverted**

16) If m is (+ve), this represents **that the image is erect**

17) If m is <1, this represents **that the image is diminished**

18) If m is >1, this represents **that the image is enlarged**

19) The lateral magnification for a plane mirror is **unity**

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20) How will you find the minimum angle of deviation? $D = \theta_i - \theta_b$

21) Is the focal length of a converging lens positive or negative? positive

22) Is the focal length of a diverging lens positive or negative? negative

23) If an object is in front of a concave mirror, is the radius of curvature positive or negative? positive

24) If an object is placed in front of a convex mirror, is the focal length positive or negative? negative

25) What's the mathematical expression for the object-image relationship for a spherical refracting surface?

$$\frac{n_a}{u} + \frac{n_b}{v} = \frac{n_b - n_a}{R}$$

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26) What's the lateral magnification for a spherical refracting surface? $-\frac{n_a v}{n_b u}$

27) For a plane refracting surface, the mathematical equation for the object-image relationship is: $\frac{n_a}{u}+\frac{n_b}{v}=0$

28) The lens-maker equation is expressed mathematically as: $\frac{1}{f}=(n-1)[\frac{1}{R_1}-\frac{1}{R_2}]$

29) For a bi-convex lens, the radius of curvature for R1 and R2 are **Positive and Negative** respectively.

30) For a bi-concave lens, the radius of curvature for R1 and R2 are **Negative and Positive** respectively.

31) For a thin lens with a convex surface and a concave surface, the radius of curvature for R1 and R2 are **Positive and Positive** respectively.

PHYS 102- GENERAL REVIEW
Identifying Equations: ELECTRICITY

1) Two positive charges or two negative charges **Repel**

2) A positive charge and a negative charge **Attract**

3) The mass of the electron is : $\mathbf{9.109 \times 10^{-31} kg}$

4) The mass of proton is: $\mathbf{1.673 \times 10^{-27} kg}$

5) The mass of neutron is : $\mathbf{1.675 \times 10^{-27} kg}$

6) A neutral atom is described such that: **The number of electrons equals the number of protons in the nucleus**

7) Mathematically, the Coulomb's law is expressed as: $\boldsymbol{F = \frac{k\, q_1 q_2}{r^2}}$

8) The fundamental unit of charge is expressed as: $\mathbf{1.6 \times 10^{-19} C}$

PHYS 102- GENERAL REVIEW
Identifying Equations: ELECTRICITY

9) Mathematically, the electric field intensity is represented as: $\mathbf{E} = \frac{k\,q_1}{r^2}$

10) The unit of electrical field intensity is $\frac{N}{C}$

11) For a point charge inside a spherical surface, the electric flux is represented as: $\emptyset_E = EA = \frac{q}{\varepsilon_o}$

12) Mathematically, the work done in transporting a charge from one point to another is expressed as: $W = qv$

13) The capacitance of a capacitor is mathematically expressed as: $\mathbf{C} = \frac{q}{v}$

PHYS 102- GENERAL REVIEW
Identifying Equations: ELECTRICITY

14) The capacitance of a parallel plate capacitor is expressed as: $C = \frac{\varepsilon_o A}{d}$

15) The electric field intensity between the plates of a parallel plate capacitor is expressed as: $E = \frac{q}{\epsilon_o A}$

16) The amount of energy stored in a capacitor can be mathematically expressed as $W = \frac{1}{2}\frac{q^2}{c}$ or $W = \frac{1}{2}cv^2$

17) What's the capacitance equivalent of capacitors connected in series? $\frac{1}{C_{eqv}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$

18) What's the capacitance equivalent of capacitors connected in parallel? $C_{eqv} = C_1 + C_2 + C_3$

PHYS 102- GENERAL REVIEW
Identifying Equations: ELECTRICITY

19) What's the resistance equivalent of resistors connected in series? $\boldsymbol{R_{eqv} = R_1 + R_2 + R_3}$

20) What's the resistance equivalent of resistors connected in parallel? $\boldsymbol{\frac{1}{R_{eqv}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$

21) The mathematical expression for current density is given as: $\boldsymbol{J = \frac{I}{A} = nqV_d}$

22) The unit for current density J is expressed as: $\frac{A}{m^2}$

23) The resistivity of a certain material is mathematically expressed as: $\boldsymbol{\rho = \frac{RA}{L}}$

24) The variance of resistance with temperature is mathematically expressed as: $\boldsymbol{R = R_o + \alpha R_o(T - T_o)}$

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Identifying Equations: ELECTRICITY

25) When delivering current in a circuit, the terminal potential difference is given as: $V = \varepsilon - Ir$

26) When receiving current in a circuit, the terminal potential difference is given as:

$V = \varepsilon + Ir$

PHYS 102- GENERAL REVIEW
Identifying Equations: ATOMIC

1) The energy of a photon in relation to its speed and wavelength is expressed as: $E = \frac{hc}{\lambda}$

2) Momentum is expressed mathematically as: $\rho = mv$

3) At zero rest mass, the energy of a photon is expressed as: $E = \rho c$

4) The momentum of a photon is expressed as: $\rho = \frac{h}{\lambda}$

5) The work function of a photon is same as the **Energy of the incident light = hf**

6) The three radiation that result from the nuclear disintegration are divided into: **Alpha particles**, **Beta particles** and **Gamma Ray**

7) The fundamental equation of radioactive decay is expressed as: $N^{(t)} = N_0 e^{-\lambda t}$

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Identifying Equations: ATOMIC

8) How will Tochukwu find the radius of the an atomic nucleus? $R = R_0 A^{1/3}$

9) The half-life of an atomic nuclide is represented as: $T_{1/2} = \frac{0.693}{\lambda}$

10) The mean-lifetime is expressed as: $T_{mean} = \frac{T_{1/2}}{\ln 2}$

11) Is the mean life the inverse of the disintegration constant? **True**

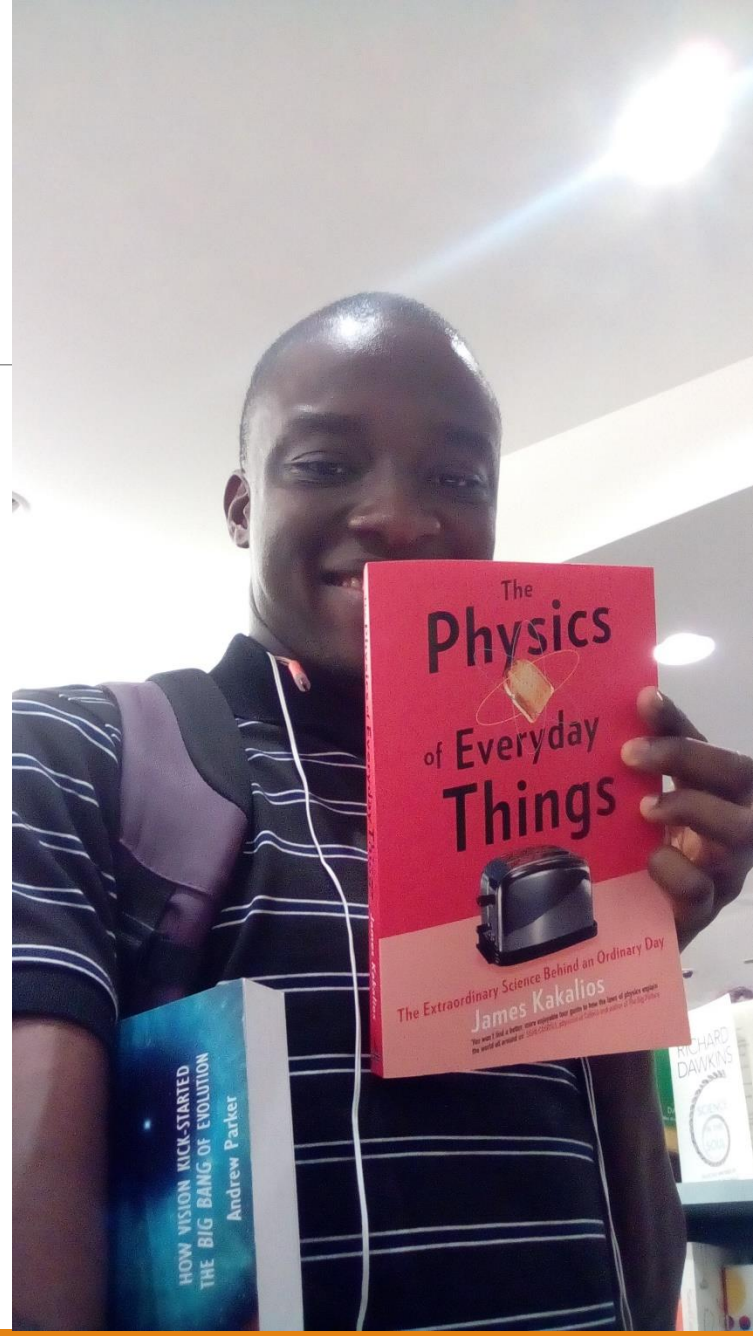
QUOTE:

FEED YOUR BODY, BUT MOST IMPORTANTLY NOURISH YOUR INNER MAN AND DEVELOP YOUR SPIRIT.

IN DOING SO, YOU WILL DEVELOP CAPACITY TO TRANSFROM YOUR WORLD.

BEST WISHES IN YOUR EXAMS

PHYSICS CHEERS!!!



About Lecturer:

Opadele A.E is a physics enthusiast with special interest in Medical Physics. He loves to present the complex theories in physics in seemingly simple approach for effectual understanding.

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