CLASS WILL START AT 5:10 PM

GENERAL APTITUDE

BASIC SCIENCE

No system
P & C
Prob.
Mm / qw

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International System of Units (SI)

SI Base Units

Base Quantity	Name	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

SI Derived Units

Derived Quantity	Name	Symbol	Equivalent SI units
Frequency	hertz	Hz	s^{-1}
Force	newton	N	$m \cdot kg \cdot s^{-2}$
Pressure	pascal	Pa	N/m^2
Energy	joule	J	N·m
Power	watt	W	J/s
Electric charge	coulomb	C	s·A
Electric potential	volt	V	W/A
Electric resistance	ohm	Ω	V/A
Celsius temperature	degree Celsius	°C	K*

SI Prefixes

Factor	Name	Symbol	Numerical Value
10^{12}	tera	T	1 000 000 000 000
10^{9}	giga	G	1 000 000 000
10^{6}	mega	M	1 000 000
10^{3}	kilo	k	1 000
10^{2}	hecto	h	100
10^{1}	deka	da	10
10^{-1}	deci	d	0.1
10^{-2}	centi	c	0.01
10^{-3}	milli	m	0.001
10^{-6}	micro	μ	0.000 001
10^{-9}	nano	n	0.000 000 001
10^{-12}	pico	p	0.000 000 000 001

$f = \frac{1}{T} = sec^{-1}$

$F = m \cdot a$

$1\ kg \cdot m/sec^2$

$Pressure = \frac{Force}{Area} = \frac{kg\ m/s^2}{m^2}$

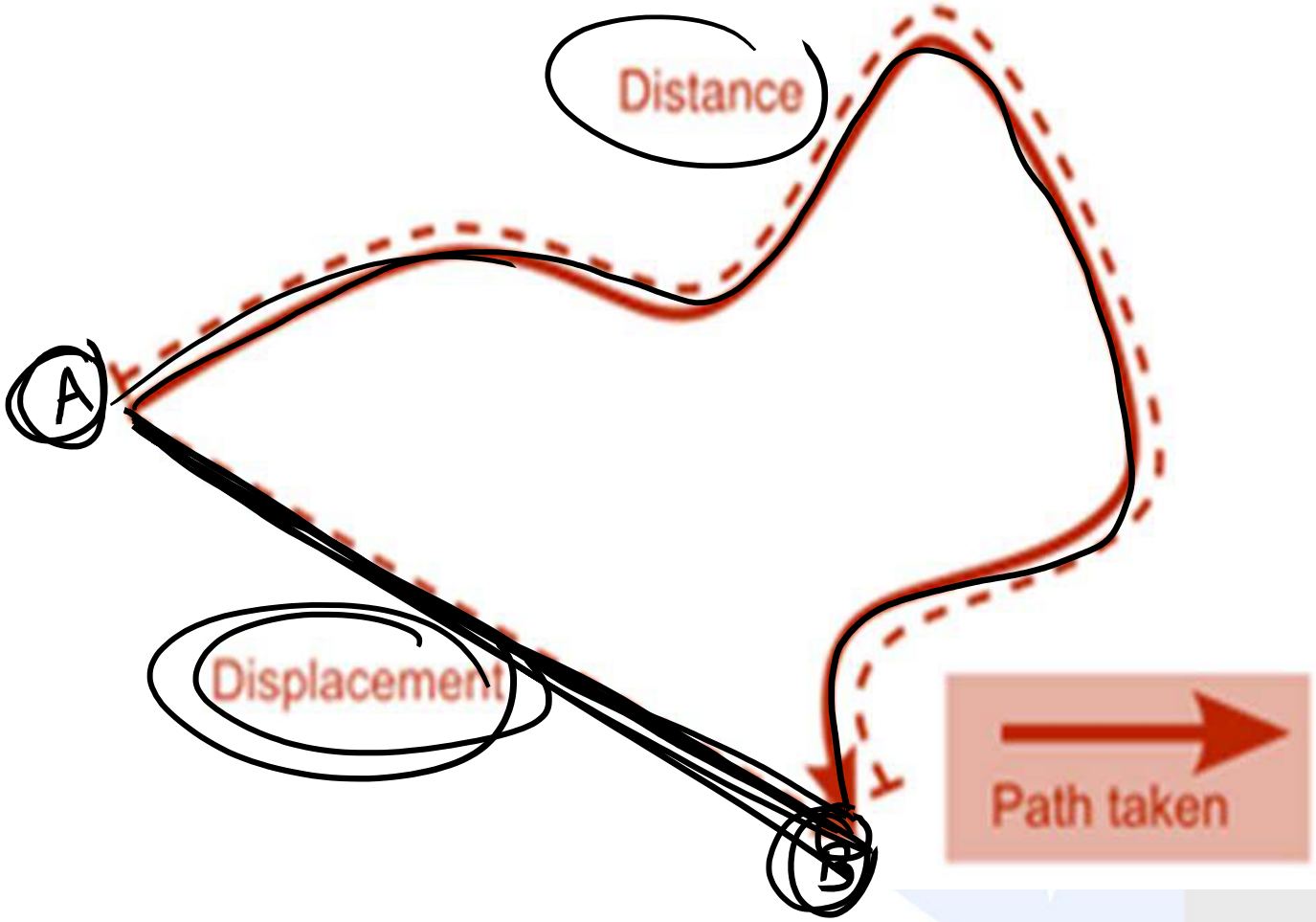
DISTANCE AND DISPLACEMENT

Distance:

Distance is a numerical description of how far apart objects are at any given moment in time.

Displacement:

Displacement is the vector that specifies the position of a point or a particle in reference to an origin or to a previous position.



Scaler

Only magnitude

11 km

Distance

Vector

magnitude + Direction

11 km, west

Displacement

Velocity:

Velocity is a vector quantity that refers to "the rate at which an object changes its position the average velocity is often computed using this formula

$$\text{Average Velocity} = \frac{\Delta \text{position}}{\text{time}} = \frac{\text{displacement}}{\text{time}}$$

$\vec{V}$

Acceleration: → Vector

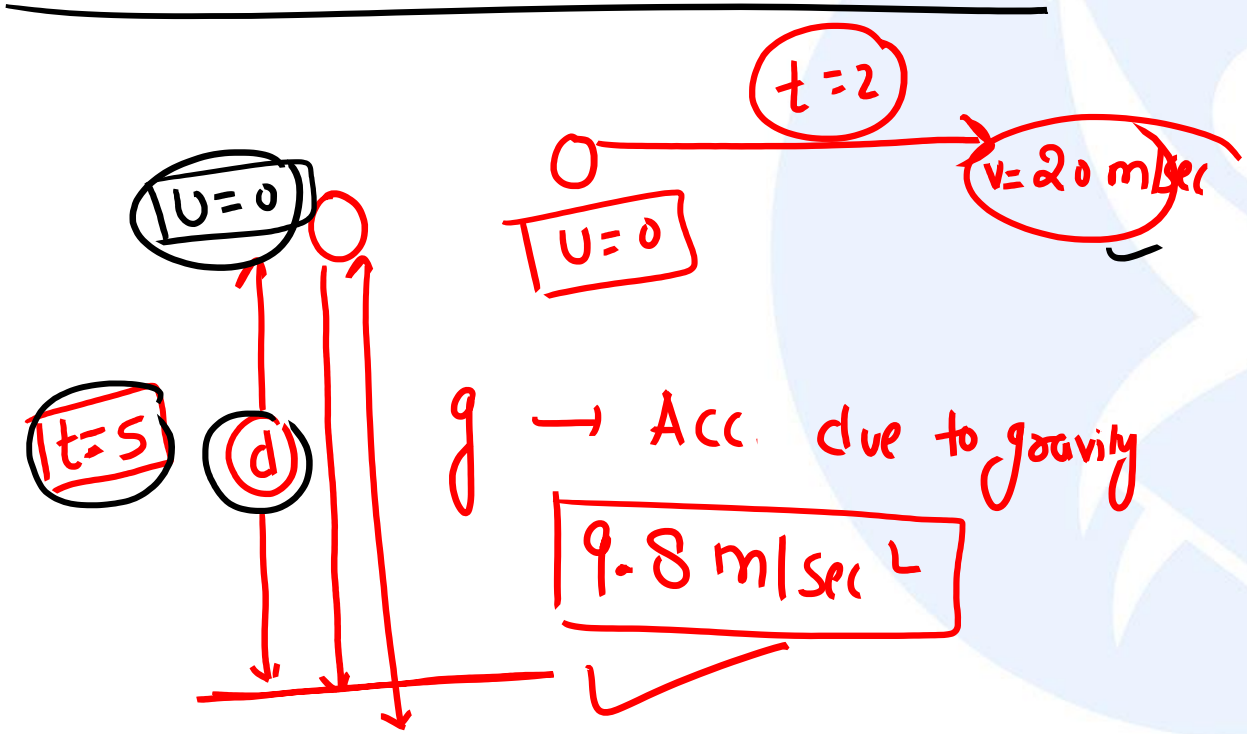
Acceleration is defined to be the rate of change of the velocity.

a= Δv/Δt

i.e a = Change in velocity/ time

V → final velocity

U → Initial velocity



$$a = \frac{\Delta v}{\Delta t}$$

$$a = \left(\frac{V - U}{t_2 - t_1}\right)$$

$$a = \frac{2v - v}{2} = \frac{2v}{2}$$

$$a = 10\ m/sec^2$$

Horizontal motion

① $V = u + at$

② $S = ut + \frac{1}{2}at^2$

③ $V^2 - u^2 = 2aS$

Vertical motion $a = g$

① $V = u + gt$

② $S = ut + \frac{1}{2}gt^2$

③ $V^2 - u^2 = 2gS$

V → Final velocity

u → Initial velocity

S → distance

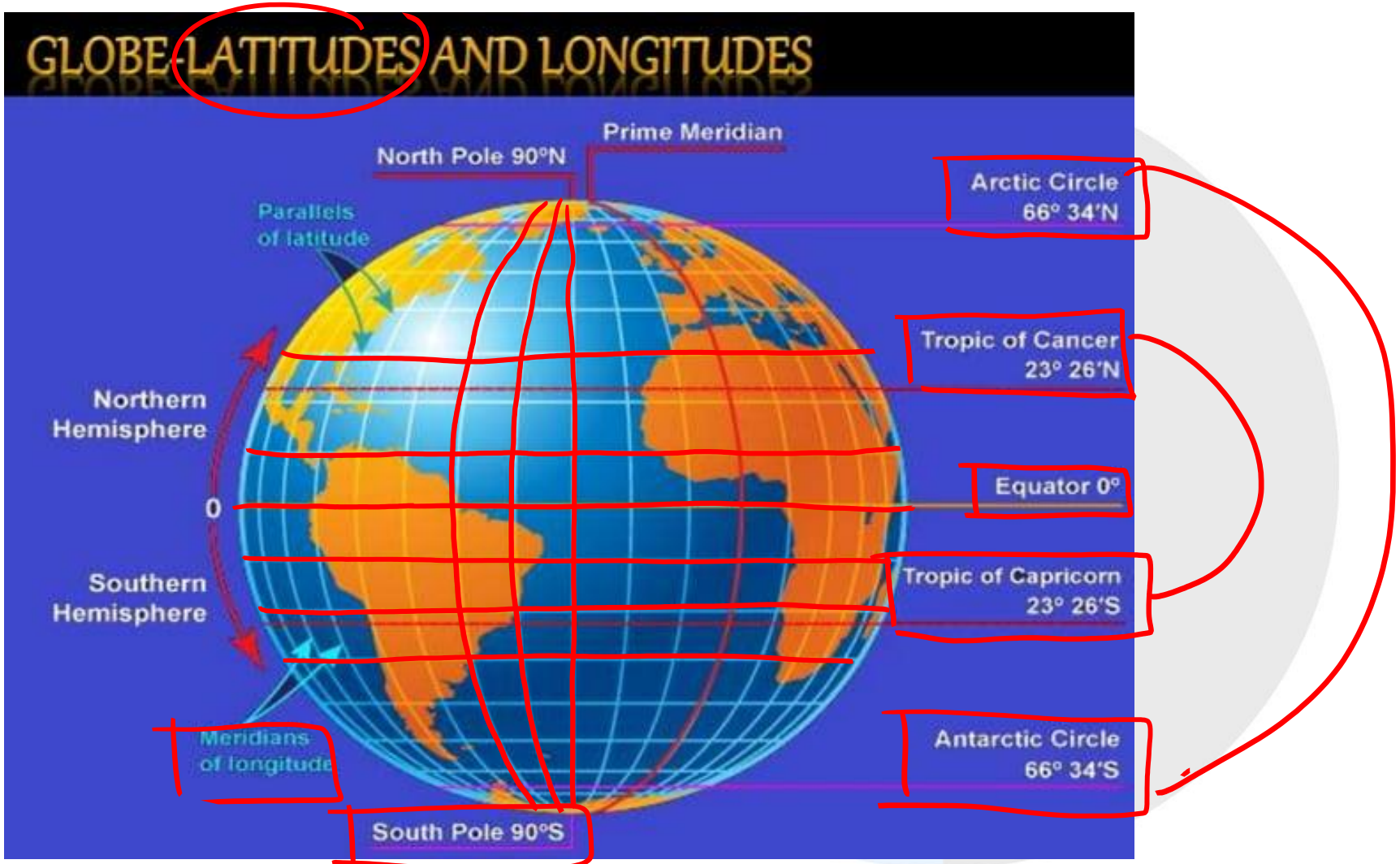
$u = 0$

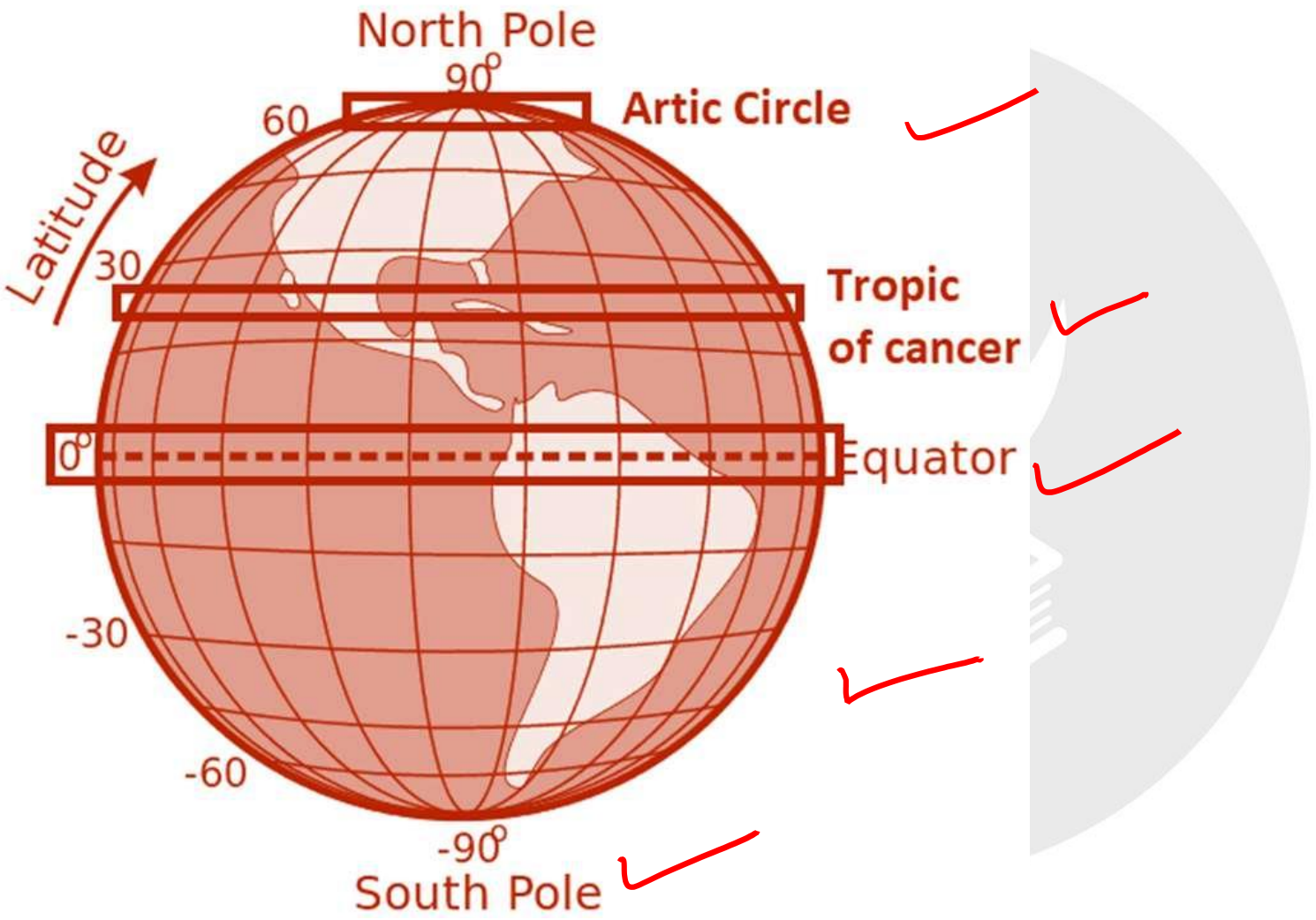
$S = ?$

$t = 5$ sec

$a = g = 9.8$

$S = \frac{1}{2} \times 9.8 \times 5^2 =$ 122.5 m


GLOBE-LATITUDES AND LONGITUDES
North Pole 90°N
Prime Meridian
Parallels of latitude
Arctic Circle 66° 34'N
Tropic of Cancer 23° 26'N
Northern Hemisphere
0
Equator 0°
Southern Hemisphere
Tropic of Capricorn 23° 26'S
Meridians of longitude
Antarctic Circle 66° 34'S
South Pole 90°S


North Pole
90°
60
Artic Circle
Latitude
30
Tropic
of cancer
0°
Equator
-30
-60
-90°
South Pole

(CSIR NET/JRF JUNE 2021)

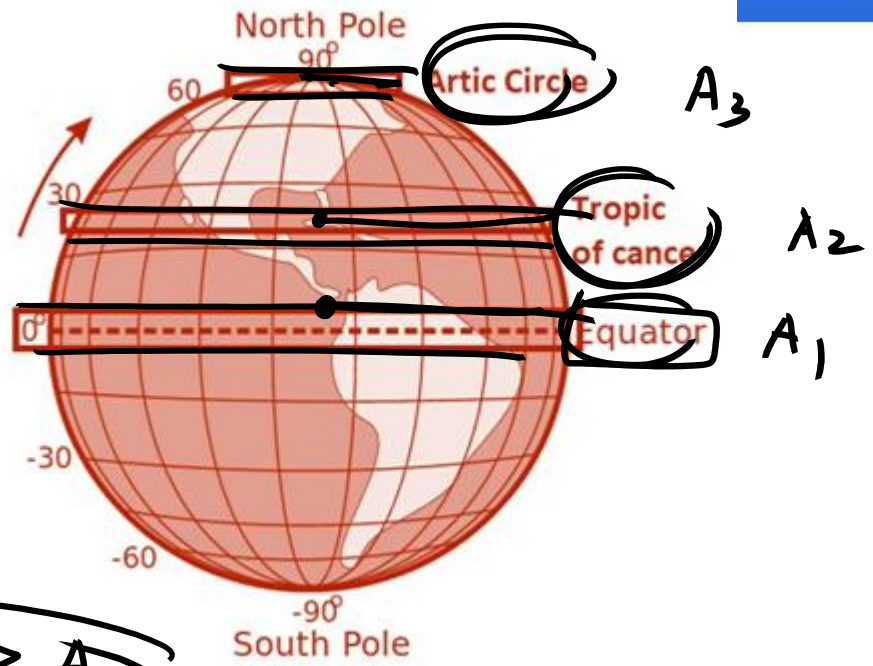
Three strips of 10 m width each are placed along the equator (A1), the Tropic of Cancer (A2), and the Arctic Circle (A3), respectively. The relationship amongst the areas of the strips is

(1) $A_1 < A_2 < A_3$

(2) $A_1 = A_2 > A_3$

(3) $A_1 > A_2 = A - 3$

(4) A1 > A2 > A3



$A_1 > A_2 > A_3$

Pendulum

Aptitude IFAS

The period T of a simple pendulum, the time taken for a complete cycle, is:

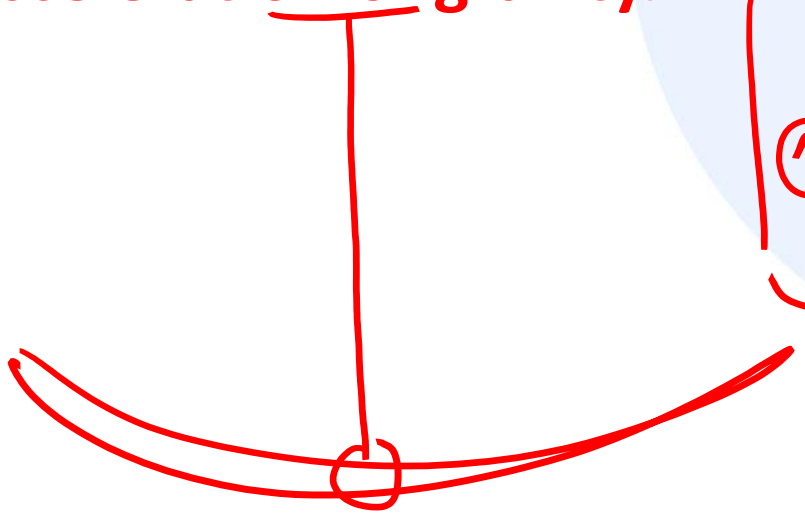
$$T \approx 2\pi \sqrt{L/g}$$

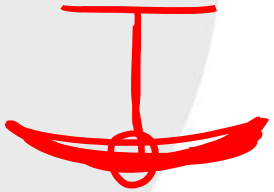
$$T = 2\pi\sqrt{\frac{L}{g}}$$

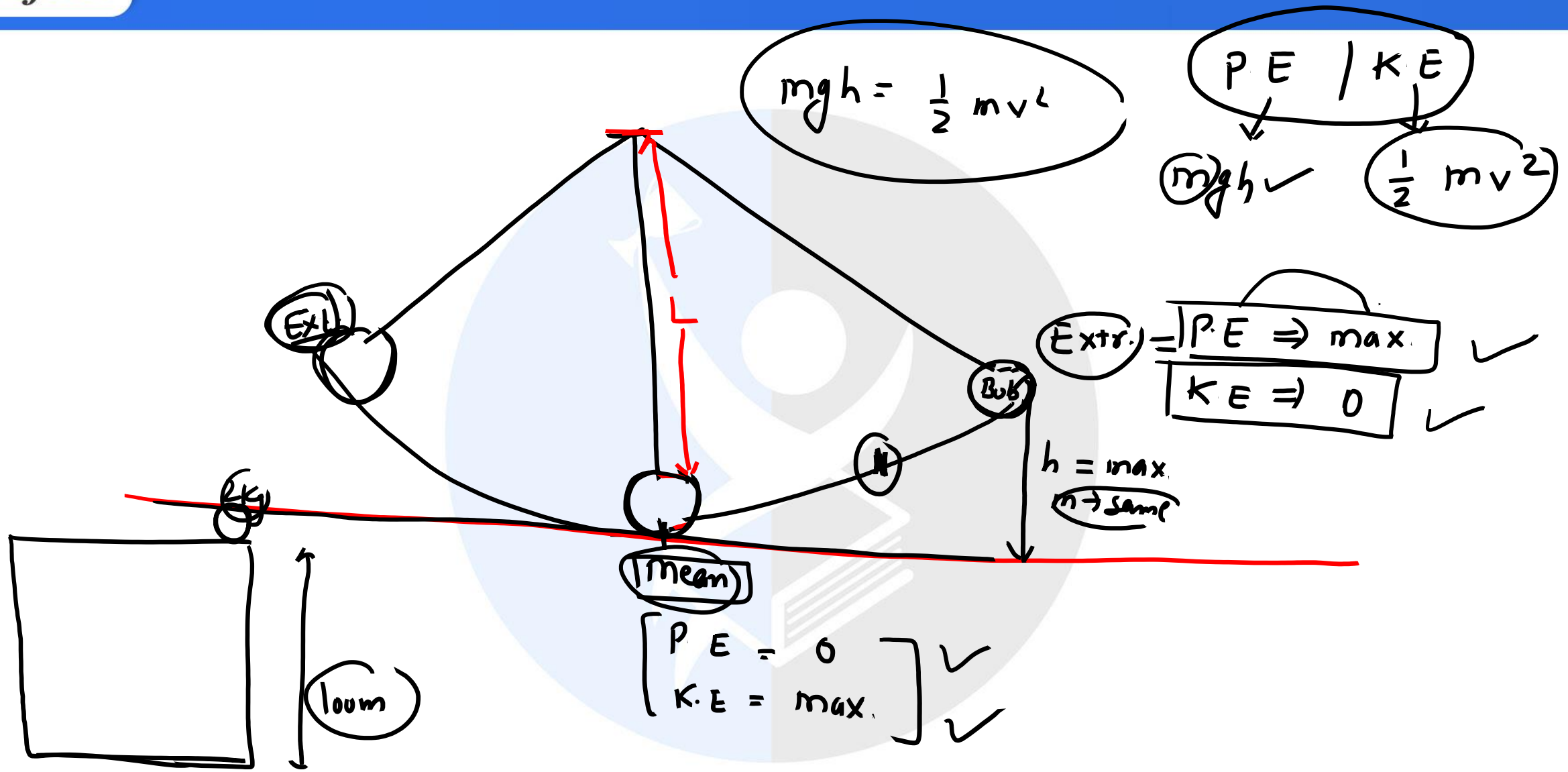
where L is the length of the pendulum and g is the local acceleration of gravity.

$$T \propto \sqrt{L}$$

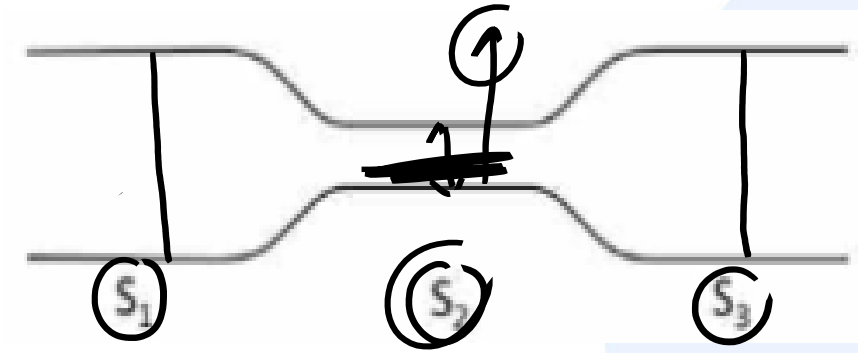
$$\uparrow T \propto \frac{1}{\sqrt{g}\downarrow}$$



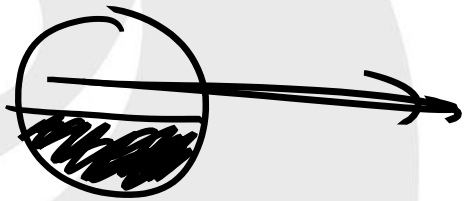



mgh = ½ mv²
PE / KE
mgh
½ mv²
Extr.
PE ⇒ max
KE ⇒ 0
Bob
h = max
m → same
Eq
Mean
PE = 0
K.E = max
100m

Water is pumped into a long horizontal pipe at a fixed volumetric rate. The diameter of the pipe changes along its length as shown in the figure. : (JUNE 2022)



$A_1 v_1 = A_2 v_2$



The speed of water is

1. the same in sections S1, S2 and S3.
2. lower in section S2 compared to the other sections.
3. higher in section S2 compared to the other sections.
4. reduces gradually from S1 to S3

(CSIR NET/JRF JUNE 2021)

If a plant with green leaves is kept in a dark room with only green light on, which one of the following would we observe?

(1) The plant appears brighter than the surroundings

(2) The plant appears darker than the surroundings

(3) We cannot distinguish the plant from the surroundings

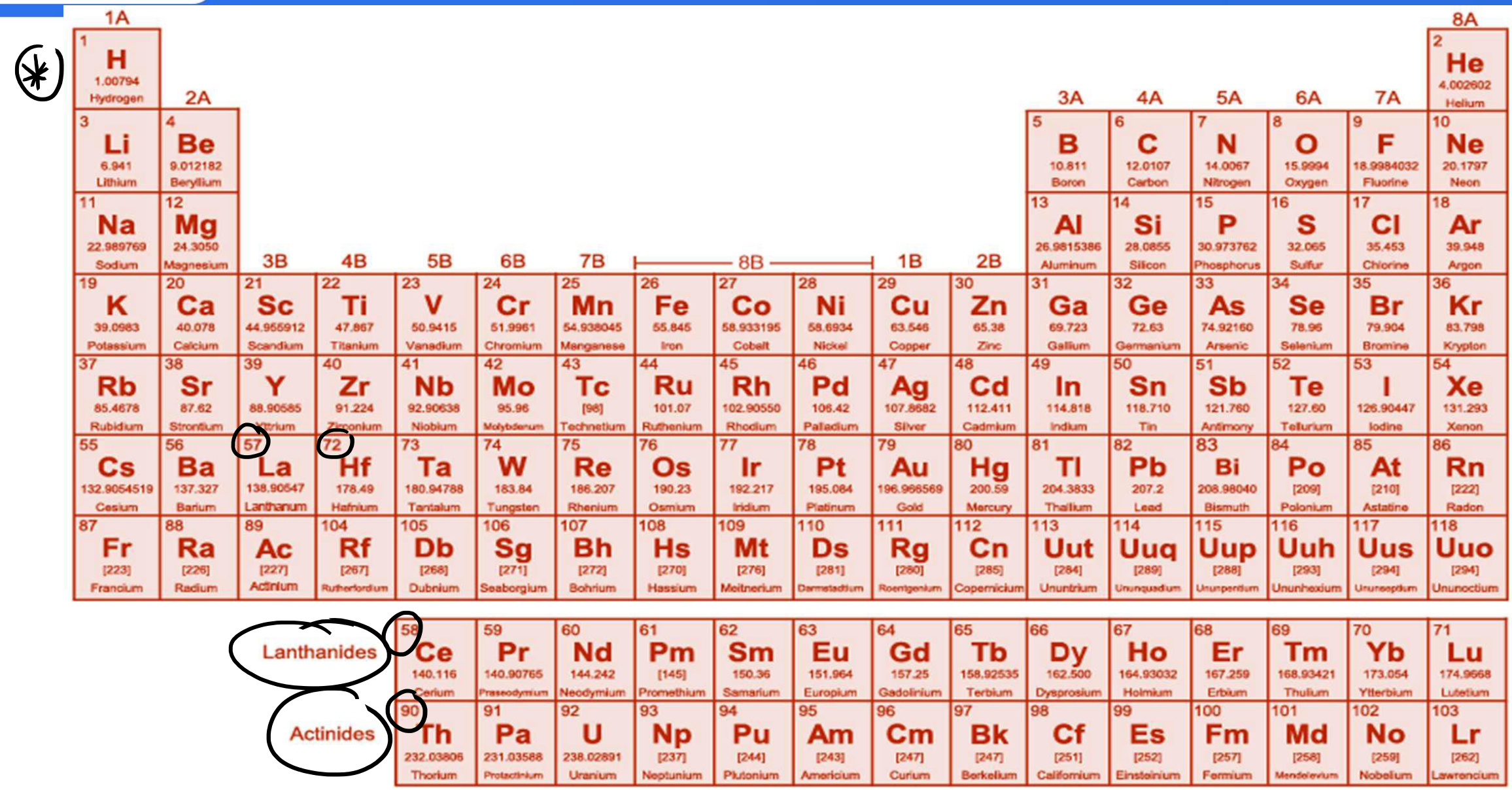
(4) It will have above normal photosynthetic activity

Explanation:

The tree leaves appear green since it reflects green light and absorb all other six lights. When you have this tree with the green light on, it will be a beautiful scene to watch as it will reflect more green light and will seem like brighter

PERIODIC TABLE

The periodic table is a tabular arrangement of the chemical elements, ordered by their atomic number (number of protons), electron configurations, and recurring chemical properties.


1A
8A
1 H 1.00794 Hydrogen
2 He 4.002602 Helium
2A
3A
4A
5A
6A
7A
3 Li 6.941 Lithium
4 Be 9.012182 Beryllium
5 B 10.811 Boron
6 C 12.0107 Carbon
7 N 14.0067 Nitrogen
8 O 15.9994 Oxygen
9 F 18.9984032 Fluorine
10 Ne 20.1797 Neon
11 Na 22.989769 Sodium
12 Mg 24.3050 Magnesium
13 Al 26.9815386 Aluminum
14 Si 28.0855 Silicon
15 P 30.973762 Phosphorus
16 S 32.065 Sulfur
17 Cl 35.453 Chlorine
18 Ar 39.948 Argon
3B
4B
5B
6B
7B
8B
1B
2B
19 K 39.0983 Potassium
20 Ca 40.078 Calcium
21 Sc 44.955912 Scandium
22 Ti 47.867 Titanium
23 V 50.9415 Vanadium
24 Cr 51.9961 Chromium
25 Mn 54.938045 Manganese
26 Fe 55.845 Iron
27 Co 58.933195 Cobalt
28 Ni 58.6934 Nickel
29 Cu 63.546 Copper
30 Zn 65.38 Zinc
31 Ga 69.723 Gallium
32 Ge 72.63 Germanium
33 As 74.92160 Arsenic
34 Se 78.96 Selenium
35 Br 79.904 Bromine
36 Kr 83.798 Krypton
37 Rb 85.4678 Rubidium
38 Sr 87.62 Strontium
39 Y 88.90585 Yttrium
40 Zr 91.224 Zirconium
41 Nb 92.90638 Niobium
42 Mo 95.96 Molybdenum
43 Tc [98] Technetium
44 Ru 101.07 Ruthenium
45 Rh 102.90550 Rhodium
46 Pd 106.42 Palladium
47 Ag 107.8682 Silver
48 Cd 112.411 Cadmium
49 In 114.818 Indium
50 Sn 118.710 Tin
51 Sb 121.760 Antimony
52 Te 127.60 Tellurium
53 I 126.90447 Iodine
54 Xe 131.293 Xenon
55 Cs 132.9054519 Cesium
56 Ba 137.327 Barium
57 La 138.90547 Lanthanum
72 Hf 178.49 Hafnium
73 Ta 180.94788 Tantalum
74 W 183.84 Tungsten
75 Re 186.207 Rhenium
76 Os 190.23 Osmium
77 Ir 192.217 Iridium
78 Pt 195.084 Platinum
79 Au 196.966569 Gold
80 Hg 200.59 Mercury
81 Tl 204.3833 Thallium
82 Pb 207.2 Lead
83 Bi 208.98040 Bismuth
84 Po [209] Polonium
85 At [210] Astatine
86 Rn [222] Radon
87 Fr [223] Francium
88 Ra [226] Radium
89 Ac [227] Actinium
104 Rf [267] Rutherfordium
105 Db [268] Dubnium
106 Sg [271] Seaborgium
107 Bh [272] Bohrium
108 Hs [270] Hassium
109 Mt [276] Meitnerium
110 Ds [281] Darmstadtium
111 Rg [280] Roentgenium
112 Cn [285] Copernicium
113 Uut [284] Ununtrium
114 Uuq [289] Ununquadium
115 Uup [288] Ununpentium
116 Uuh [293] Ununhexium
117 Uus [294] Ununseptium
118 Uuo [294] Ununoctium
Lanthanides
58 Ce 140.116 Cerium
59 Pr 140.90765 Praseodymium
60 Nd 144.242 Neodymium
61 Pm [145] Promethium
62 Sm 150.36 Samarium
63 Eu 151.964 Europium
64 Gd 157.25 Gadolinium
65 Tb 158.92535 Terbium
66 Dy 162.500 Dysprosium
67 Ho 164.93032 Holmium
68 Er 167.259 Erbium
69 Tm 168.93421 Thulium
70 Yb 173.054 Ytterbium
71 Lu 174.9668 Lutetium
Actinides
90 Th 232.03806 Thorium
91 Pa 231.03588 Protactinium
92 U 238.02891 Uranium
93 Np [237] Neptunium
94 Pu [244] Plutonium
95 Am [243] Americium
96 Cm [247] Curium
97 Bk [247] Berkelium
98 Cf [251] Californium
99 Es [252] Einsteinium
100 Fm [257] Fermium
101 Md [258] Mendelevium
102 No [259] Nobelium
103 Lr [262] Lawrencium

(CSIR NET/JRF JUNE 2015)

If,

aN → S

eF → I

gH → M

then nS → ?

(1) T

(2) A

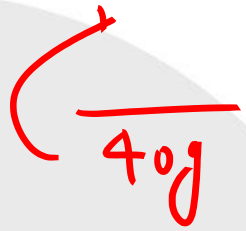
(3) L

(4) K

(CSIR NET/JRF DEC 2018)

(*) After 6 g of carbon is completely burnt in an atmosphere of 40 g of oxygen, the percentage oxygen left is:

(1) 80
(2) 60
(3) 40
(4) 20

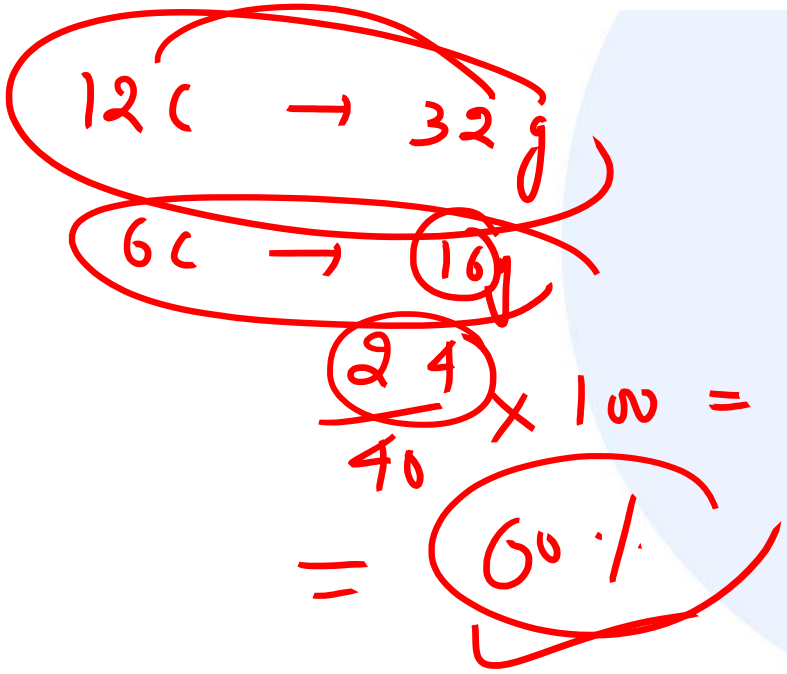


(CSIR NET/JRF DEC 2018)

After 6 g of carbon is completely burnt in an atmosphere of 40 g of oxygen, the percentage oxygen left is:

(1) 80 (2) 60

(3) 40 (4) 20



Explanation:

Molecular mass of carbon = 12

=> 12 gms of carbon =1 mole carbon

=> 6 gms of carbon = 0.5 moles of carbon

Molecular weight of oxygen = 32

=> 1 mole of oxygen = 32 gms

The chemical reaction between carbon and oxygen is as follows:

$C + O_2 = CO_2$

i.e 1 mole of carbon will react with 1 mole of oxygen

=> 0.5 mole of carbon will react with 0.5 mole of oxygen

Hence oxygen consumed in the reaction

= 0.5 mole = 16 gms

So oxygen left = 40 - 16 = 24 gms

% of oxygen left = 24 x 100/40 = 60%

Hence 60% of oxygen will be left.

Answer: (2)

HAPPY LEARNING

THANKS

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