100 Most Important General Science One-Liners

Curated from 10th Standard Samacheer Kalvi Textbook for TNPSC Preparation

PHYSICS

1. **Newton's First Law definition:** It states that everybody continues to be in its state of rest or the state of uniform motion along a straight line unless it is acted upon by some external force.
2. **Types of Inertia:** Inertia of rest, inertia of motion, and inertia of direction.
3. **SI unit of Linear Momentum:** Kilogram metre per second ($kg \cdot m \cdot s^{-1}$).
4. **Mathematical formula for Force:** F = ma (Force = mass × acceleration).
5. **Definition of Impulse:** A very large force acting for a very short period of time (J = F × t).
6. **Principle behind rocket propulsion:** Newton's third law of motion and the law of conservation of linear momentum.
7. **Value and SI unit of Universal Gravitational Constant (G):** $6.674 \times 10^{-11}\ N \cdot m^2 \cdot kg^{-2}$.
8. **Value of acceleration due to gravity (g) at the center of the Earth:** Zero.
9. **Variation of weight on Earth:** Maximum at the poles and minimum at the equator.
10. **Refractive index (μ) formula:** $\mu = \frac{c}{v}$ (Speed of light in vacuum / Speed of light in the medium).
11. **Snell's Law formula:** $\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$ (or $\mu_1 \sin i = \mu_2 \sin r$).
12. **Rayleigh's scattering law:** The amount of scattering of light (S) is inversely proportional to the fourth power of its wavelength $\left(S \propto \frac{1}{\lambda^4}\right)$.
13. **Reason the sky appears blue:** Blue light has a shorter wavelength and scatters more than other colors according to Rayleigh's law.
14. **Reason danger signals are red:** Red light has the longest wavelength and is scattered the least by air molecules.
15. **Nature of convex and concave lenses:** A convex lens is a converging lens, and a concave lens is a diverging lens.
16. **Standard Lens Formula:** $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$.

17. **SI unit of Power of a Lens:** Dioptre (D).
18. **Myopia (Short-sightedness) correction lens:** Concave lens.
19. **Hypermetropia (Long-sightedness) correction lens:** Convex lens.
20. **Presbyopia correction lens:** Bifocal lens.
21. **Official SI unit of Temperature:** Kelvin (K).
22. **Ideal Gas Equation:** PV = nRT.
23. **Value of Avogadro's number:** 6.023×10^{23} /mol.
24. **Ohm's Law formula:** V = IR.
25. **SI unit of Electrical Resistivity (ρ):** Ohm-metre (Ω·m).
26. **Equivalent resistance in Series:** ($R_s = R_1 + R_2 + R_3$).
27. **Equivalent resistance in Parallel:** $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$.
28. **Joule's Law of Heating formula:** $H = I^2Rt$.
29. **Material used for electric fuse wire:** An alloy of Lead and Tin (due to low melting point).
30. **Domestic electricity supply specifications in India:** 220 V and 50 Hz.
31. **Audible sound frequency range for humans:** 20 Hz to 20,000 Hz.
32. **Infrasonic sound frequency:** Sound with a frequency less than 20 Hz.
33. **Ultrasonic sound frequency:** Sound with a frequency greater than 20,000 Hz.
34. **Minimum distance required to hear an echo:** 17.2 metres.
35. **Discoverer of Natural Radioactivity:** Henri Becquerel.
36. **Discoverers of Radium and Polonium:** Marie Curie and Pierre Curie.
37. **Radioactive ray with the highest ionizing power:** Alpha (α) rays.
38. **Radioactive ray with the highest penetrating power:** Gamma (γ) rays.
39. **Soddy and Fajans displacement law for Alpha decay:** The mass number decreases by 4 and the atomic number decreases by 2.
40. **Soddy and Fajans displacement law for Beta decay:** The mass number remains the same and the atomic number increases by 1.

41. **Principle behind a Nuclear Reactor:** Controlled nuclear fission chain reaction.
42. **Fuel used in the atomic bomb vs. hydrogen bomb:** Atomic bomb uses nuclear fission; Hydrogen bomb uses nuclear fusion.
43. **Radioisotope used to treat skin cancer:** Radio-phosphorus (P-32).
44. **Radioisotope used to diagnose thyroid disorders:** Radio-iodine (I-131).
45. **Radioisotope used for determining the age of fossils:** Carbon-14 (C-14).
46. **Materials used as Control Rods in a nuclear reactor:** Boron or Cadmium.
47. **Materials used as Moderators in a nuclear reactor:** Heavy water (D_2O) or Graphite.

CHEMISTRY

48. **Formula to calculate the number of Moles from mass:** $= \frac{\text{Mass}}{\text{Atomic or Molecular Mass}}$.
49. **Atomicity of Ozone:** 3 (Triatomic).
50. **Atomicity of Phosphorus:** 4 (Tetratomic).
51. **Molar volume of any gas at STP:** 22.4 Litres (or 22,400 ml).
52. **Relationship between Molecular Mass and Vapour Density:** Relative Molecular Mass = 2 × Vapour Density.
53. **Modern Periodic Law formulation:** The physical and chemical properties of the elements are the periodic functions of their atomic numbers.
54. **Formulator of the Modern Periodic Table:** Henry Moseley.
55. **Group 1 elements name:** Alkali metals.
56. **Group 17 elements name:** Halogens.
57. **Group 18 elements name:** Noble gases / Inert gases.
58. **Atomic Radius trend across a period:** Decreases from left to right.
59. **Ionization Energy trend across a period:** Increases from left to right.
60. **Chief ore of Aluminium and its formula:** Bauxite ($Al_2O_3 \cdot 2H_2O$).
61. **Composition of Brass:** Copper (Cu) and Zinc (Zn).
62. **Composition of Bronze:** Copper (Cu) and Tin (Sn).
63. **Definition of Amalgam:** An alloy of mercury with another metal.

64. **Factors affecting Solubility:** Nature of solute and solvent, temperature, and pressure.
65. **Deliquescent substance definition:** Substances that absorb moisture from atmospheric air at ordinary temperature and dissolve in it.
66. **Hygroscopic substance definition:** Substances that absorb moisture from atmospheric air without changing their physical state.
67. **Chemical name and formula of Blue Vitriol:** Copper Sulphate Pentahydrate ($CuSO_4 \cdot 5H_2O$).
68. **Color change of Blue Vitriol upon heating:** Turns from blue to white anhydrous copper sulphate.
69. **Definition of Chemical Equilibrium:** A state in a reversible reaction where the rate of the forward reaction equals the rate of the backward reaction.
70. **Inventor of the pH scale:** S. P. L. Sorensen.
71. **pH value of pure water:** 7 (Neutral).
72. **Normal pH range of human blood:** 7.35 to 7.45.
73. **Chemical name and formula of Rust:** Hydrated Ferric Oxide ($Fe_2O_3 \cdot xH_2O$).
74. **Catenation definition:** The ability of an element (like Carbon) to form a long chain of atoms through covalent bonds.
75. **Functional group of Alcohol:** -OH.
76. **Functional group of Carboxylic Acid:** -COOH.
77. **Esterification definition:** The reaction between an alcohol and a carboxylic acid to form a sweet-smelling ester.
78. **General formula for Alkanes:** C_nH_{2n+2}.
79. **General formula for Alkenes:** C_nH_{2n}
80. **General formula for Alkynes:** C_nH_{2n-2}.

BIOLOGY & ENVIRONMENT

81. **Three tissue systems in plants (Sachs classification):** Dermal (Epidermal), Ground, and Vascular tissue systems.
82. **Balanced Photosynthesis equation:**

$$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2.$$

83. **Site of Kreb's cycle inside the cell:** Mitochondria (specifically the mitochondrial matrix).
84. **Respiratory Quotient (RQ) formula:** $\frac{\text{Volume of } CO_2 \text{ liberated}}{\text{Volume of } O_2 \text{ consumed}}$.
85. **Meaning of Heterodont dentition (e.g., Rabbit):** Presence of different types of teeth (Incisors, Canines, Premolars, Molars).
86. **Dental formula of a Rabbit:** $\frac{2033}{1023}$ (Total = 28 teeth).
87. **Function of Xylem tissue:** Conduction of water and minerals upward from roots to leaves.
88. **Function of Phloem tissue:** Translocation of synthesized organic food materials from leaves to other parts.
89. **Cause of the first heart sound (Lubb):** Closure of the tricuspid and bicuspid (mitral) valves.
90. **Cause of the second heart sound (Dupp):** Closure of the aortic and pulmonary semilunar valves.
91. **Discoverers of the Rh blood factor:** Karl Landsteiner and Alexander Wiener in 1940.
92. **Three structural layers of the Meninges (brain coverings):** Dura mater (outer), Arachnoid mater (middle), and Pia mater (inner).
93. **Path of a nerve impulse in a Reflex Arc:** Receptor → Sensory Neuron → Spinal cord (Interneuron) → Motor Neuron → Effector organ.
94. **Plant hormone known as the Stress Hormone:** Abscisic Acid (ABA).
95. **Gaseous plant hormone responsible for fruit ripening:** Ethylene.
96. **Hormone requiring Iodine for synthesis:** Thyroxine (produced by the thyroid gland).
97. **Cells in the Islets of Langerhans that secrete Insulin:** Beta (β) cells.
98. **Cells in the Islets of Langerhans that secrete Glucagon:** Alpha (α) cells.
99. **Structural connection linking birds and reptiles (Fossil bird):** Archaeopteryx.
100. **Main component of Biogas:** Methane (CH_4).