Interactive Practice & Step-by-Step Solutions: Practice chapter-wise PYQs with timer & full explanation on The Crucible.

Open on The Crucible ↗

Atomic Physics — Atomic Spectrum · **BITSAT 2023 Memory-Based** Practice on Crucible ↗

1. A $12.5\mathrm{eV}$ electron beam is used to bombard gaseous hydrogen at room temperature. The number of spectral lines emitted will be:

(A) 2 **(B)** 1

(C) 3 **(D)** 4

Electrostatics · **BITSAT 2023 Memory-Based** Practice on Crucible ↗

2. The force between two small charged spheres having charges of $1 \times 10^{-7}\mathrm{C}$ and $2 \times 10^{-7}\mathrm{C}$ placed $20\ \mathrm{cm}$ apart in air is

(A) $4.5 \times 10^{-2}\ \mathrm{N}$ **(B)** $5.4 \times 10^{-2}\ \mathrm{N}$

(C) $4.5 \times 10^{-3}\ \mathrm{N}$ **(D)** $5.4 \times 10^{-3}\ \mathrm{N}$

Capacitance · **BITSAT 2023 Memory-Based** Practice on Crucible ↗

3. The work done in placing a charge of 8×10^{-18} coulomb on a condenser of capacity 100 microfarad is

(A) 3.1×10^{-26} joule **(B)** 4×10^{-10} joule

(C) 32×10^{-32} joule **(D)** 16×10^{-32} joule

Magnetic Effects of Current · **BITSAT 2023 Memory-Based** Practice on Crucible ↗

4. A charge particle is moving in a uniform magnetic field $(2\hat{i} + 3\hat{j})\mathrm{T}$. If it has an acceleration of $(\alpha\hat{i} - 4\hat{j})\mathrm{m/s^2}$, then the value of α will be :

(A) 3 **(B)** 6

(C) 12 **(D)** 2

Ray Optics — Optical Instruments · **BITSAT 2023 Memory-Based** Practice on Crucible ↗

5. In a reflecting telescope, a secondary mirror is used to:

(A) reduce the problem of mechanical support **(B)** remove spherical aberration

(C) make chromatic aberration zero **(D)** move the eyepiece outside the telescopic tube

Kinetic Theory of Gases — Gas Laws · BITSAT 2023 Memory-Based

Practice on Crucible ↗

6. A bicycle tyre is filled with air having pressure of $270\mathrm{kPa}$ at $27^{\circ}\mathrm{C}$. The approximate pressure of the air in the tyre when the temperature increases to $36^{\circ}\mathrm{C}$ is

(A) $270\mathrm{kPa}$

(B) $262\mathrm{KPa}$

(C) $278\mathrm{kPa}$

(D) $360\mathrm{kPa}$

Oscillations · BITSAT 2023 Memory-Based

Practice on Crucible ↗

7. A particle executes SHM of amplitude A. The distance from the mean position when it's kinetic energy becomes equal to its potential energy is

(A) $\sqrt{2}\ \mathrm{A}$

(B) $2\ \mathrm{A}$

(C) $\frac{1}{\sqrt{2}}\ \mathrm{A}$

(D) $\frac{1}{2}\ \mathrm{A}$

Gravitation — Newton's Law of Gravitation · BITSAT 2023 Memory-Based

Practice on Crucible ↗

8. Two planets A and B of radii R and $1.5R$ have densities ρ and $\rho/2$ respectively. The ratio of acceleration due to gravity at the surface of B to A is :

(A) $2:3$

(B) $2:1$

(C) $3:4$

(D) $4:3$

Mechanical Properties of Solids · BITSAT 2023 Memory-Based

Practice on Crucible ↗

9. A $100\ \mathrm{m}$ long wire having cross-sectional area $6.25\times10^{-4}\ \mathrm{m}^2$ and Young's modulus is $10^{10}\ \mathrm{Nm}^{-2}$ is subjected to a load of $250\ \mathrm{N}$, then the elongation in the wire will be :

(A) $6.25\times10^{-3}\ \mathrm{m}$

(B) $4\times10^{-4}\ \mathrm{m}$

(C) $6.25\times10^{-6}\ \mathrm{m}$

(D) $4\times10^{-3}\ \mathrm{m}$

Waves and Sound — Speed of Sound Waves · BITSAT 2023 Memory-Based

Practice on Crucible ↗

10. The ratio of speed of sound in hydrogen gas to the speed of sound in oxygen gas at the same temperature is:

(A) $4:1$

(B) $1:2$

(C) $1:4$

(D) $1:1$

Magnetic Properties of Matter · BITSAT 2023 Memory-Based

Practice on Crucible ↗

11. The free space inside a current carrying toroid is filled with a material of susceptibility 2×10^{-2}. The percentage increase in the value of magnetic field inside the toroid will be

(A) 2%

(B) 0.2%

(C) 0.1%

(D) 1%

Electromagnetic Waves · BITSAT 2023 Memory-Based

Practice on Crucible ↗

12. The ratio of average electric energy density and total average energy density of electromagnetic wave is :

(A) 2

(B) $\frac{1}{2}$

(C) 1

(D) 3

Current Electricity · BITSAT 2023 Memory-Based

Practice on Crucible ↗

13. Ratio of thermal energy released in two resistor R and $3R$ connected in parallel in an electric circuit is :

(A) 3 : 1

(B) 1 : 1

(C) 1 : 3

(D) 1 : 27

Center of Mass Momentum and Collision — momentum · BITSAT 2023 Memory-Based

Practice on Crucible ↗

14. Two bodies are having kinetic energies in the ratio $16 : 9$. If they have same linear momentum, the ratio of their masses respectively is:

(A) 4 : 3

(B) 3 : 4

(C) 16 : 9

(D) 9 : 16

Wave Optics — Diffraction of Light · BITSAT 2023 Memory-Based

Practice on Crucible ↗

15. A single slit of a width a is illuminated by a monochromatic light of wavelength $600\ \mathrm{nm}$. The value of ' a ' for which first minimum appears at $\theta = 30^{\circ}$ on the screen will be :

(A) $0.6\mu\mathrm{m}$

(B) $1.2\mu\mathrm{m}$

(C) $1.8\mu\mathrm{m}$

(D) $3\mu\mathrm{m}$

Laws of Motion — Newton's laws of motion · BITSAT 2022 PYQ

Practice on Crucible ↗

16. What will be the acceleration due to gravity at a depth d, where g is acceleration due to gravity on the surface of earth?

(A) $\frac{g}{\left[1+\frac{d}{R}\right]^2}$

(B) $g\left[1-\frac{2d}{R}\right]$

(C) $\frac{g}{\left[1-\frac{d}{R}\right]^2}$

(D) $g\left[1-\frac{d}{R}\right]$

Semiconductors — Energy Bands in Solids · BITSAT 2022 PYQ

Practice on Crucible ↗

17. For an insulator, the forbidden energy gap is

(A) Zero

(B) 1eV

(C) 2eV

(D) 5eV

Dual Nature of Matter — Photoelectric Effect · BITSAT 2022 PYQ

Practice on Crucible ↗

18. The de-Broglie wavelength of an electron moving with a velocity $\frac{c}{3}$ $\left(c = 3 \times 10^8\ \text{m/s}\right)$ is equal to the wavelength of photon. The ratio of the kinetic energies of electron and photon is

(A) $1:4$

(B) $1:3$

(C) $1:2$

(D) $2:1$

Mechanical Properties of Fluids — Surface tension · BITSAT 2022 PYQ

Practice on Crucible ↗

19. A capillary tube is attached horizontally to a constant heat arrangement. If the radius of the capillary tube is increased by 25%, then the rate of flow of liquid will change nearly by

(A) 100%

(B) 112%

(C) 124%

(D) 144%

Units and Dimensions — Dimensions · BITSAT 2021 PYQ

Practice on Crucible ↗

20. If force (F), length (L) and time (T) are assumed to be fundamental units, then the dimensional formula of the mass will be

(A) $\left[\text{FL}^{-1}\ \text{T}^2\right]$

(B) $\left[\text{FL}^{-1}\ \text{T}^{-2}\right]$

(C) $\left[\text{FL}^{-1}\ \text{T}^{-1}\right]$

(D) $\left[\text{FL}^2\ \text{T}^2\right]$

Motion In Two Dimensions — Projectile motion · BITSAT 2021 PYQ

Practice on Crucible ↗

21. A gun fires two bullets at 60° and 30° with horizontal. The bullets strike at some horizontal distance. The ratio of maximum height for the two bullets is in the ratio of

(A) $2:1$

(B) $3:1$

(C) $4:1$

(D) $1:1$

Nuclear Physics — Radioactivity · BITSAT 2021 PYQ

Practice on Crucible ↗

22. Three specimens A, B, C of same radioactive element has activities 1 microcurie, 1 rutherford and 1 becquerel respectively. Which specimen has maximum mass?

(A) A

(B) B

(C) C

(D) all have equal masses

Thermodynamics — Thermodynamic Processes · BITSAT 2021 PYQ

Practice on Crucible ↗

23. An ideal gas at atmospheric pressure is adiabatically compressed so that its density becomes 32 times of its initial value. If the final pressure of gas is 128 atmospheres, the value of ' γ ' of the gas is :

(A) 1.5

(B) 1.4

(C) 1.3

(D) 1.6

Work Power Energy — Work done · BITSAT 2020 PYQ

Practice on Crucible ↗

24. A boy pushes a toy box $2.0\ \mathrm{m}$ along the floor by means of a force of $10\ \mathrm{N}$ directed downward at an angle of 60° to the horizontal. The work done by the boy is

(A) $6\ \mathrm{J}$

(B) $8\ \mathrm{J}$

(C) $10\ \mathrm{J}$

(D) $12\ \mathrm{J}$

Thermal Properties of Matter — Thermal Expansion · BITSAT 2020 PYQ

Practice on Crucible ↗

25. A crystal has a coefficient of expansion 13×10^{-7} in one direction and 231×10^{-7} in every direction at right angles to it. Then the cubical coefficient of expansion is

(A) 462×10^{-7}

(B) 244×10^{-7}

(C) 475×10^{-7}

(D) 257×10^{-7}

Rotational Motion — Rolling without Slipping · BITSAT 2020 PYQ

Practice on Crucible ↗

26. A solid cylinder and a hollow cylinder both of the same mass and same external diameter are released from the same height at the same time on an inclined plane. Both roll down without slipping. Which one will reach the bottom first?

(A) Solid cylinder

(B) Both together

(C) One with higher density

(D) Hollow cylinder

Motion In One Dimension — Rest and Motion · BITSAT 2018 PYQ

Practice on Crucible ↗

27. Consider the acceleration, velocity and displacement of a tennis ball as its falls to the ground and bounces back. Directions of which of these change in the process?

(A) Velocity only

(B) Displacement and velocity

(C) Acceleration, velocity and displacement

(D) Displacement and acceleration

Atomic Physics — Bohr's Atomic Model · BITSAT 2023 Memory-Based

Practice on Crucible ↗

28. The angular momentum for the electron in Bohr's orbit is L. If the electron is assumed to revolve in second orbit of hydrogen atom, then the change in angular momentum will be:

(A) $\frac{L}{2}$

(B) zero

(C) L

(D) 2L

Electrostatics · BITSAT 2021 PYQ

Practice on Crucible ↗

29. The electric potential V is given as a function of distance $\times$(metre) by $V = \left(5x^2 + 10x - 4\right)$ volt. Question: Value of electric field at $x = 1\ \mathrm{m}$ is

(A) $-23\ \mathrm{V/m}$

(B) $11\ \mathrm{V/m}$

(C) $6\ \mathrm{V/m}$

(D) $-20\ \mathrm{V/m}$

Capacitance · BITSAT 2023 Memory-Based

Practice on Crucible ↗

30. A capacitor of capacitance C is charged to a potential V. The flux of the electric field through a closed surface enclosing the positive plate of the capacitor is:

(A) $\frac{CV}{2\varepsilon_0}$

(B) $\frac{2CV}{\varepsilon_0}$

(C) $\frac{CV}{\varepsilon_0}$

(D) Zero

Answer Key (Q1 to Q30)

Click any question number below to practice chapter-wise PYQs on The Crucible ↗

1: (C)	2: (C)	3: (C)	4: (B)	5: (D)	6: (C)	7: (C)	8: (C)	9: (D)	10: (A)
11: (A)	12: (B)	13: (A)	14: (D)	15: (B)	16: (D)	17: (D)	18: (B)	19: (D)	20: (A)
21: (B)	22: (A)	23: (B)	24: (C)	25: (C)	26: (A)	27: (B)	28: (C)	29: (D)	30: (C)

Sample Solution — Question 1 (BITSAT 2023 Memory-Based · Correct Option: C)

Open on The Crucible ↗

Q1. A 12.5eV electron beam is used to bombard gaseous hydrogen at room temperature. The number of spectral lines emitted will be:

If we assume electron in hydrogen atom takes energy 12.09eV from the incoming radiation, the maximum excited state of electron will be $n = 3$. So, number of spectral lines is $\frac{3(3-1)}{2} = 3$. Here we assume some part of energy $12.5\text{eV} - 12.09\text{eV} = 0.41\text{eV}$ get lost due to collision.

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