

2024 JEE 29th Shift-1 Questions

HISTORY CREATED

39 YEARS OF ACADEMIC EXCELLENCE

ASIS'S GREATEST EDUCATION BRAND IN

IIT-JEE, NEET & OLYMPIADS

THE PERFECT HAT-TRICK WITH **ALL-INDIA RANK 1**

JEE MAIN



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PHYSICS
SECTION - A

- Debroglie wavelength of an electron & photon is same. Velocity of electron is 25% of velocity of light. Find the ratio of Kinetic Energy of electron by photon?
 - 1
 - 1/2
 - 8
 - 1/8
- The voltage applied across the resistance R is $V = (200 \pm 5)$ Volts and current in the resistance is $i = (20 \pm 0.5)$ Amp. Find % error in Resistance?
 - 3.5%
 - 5%
 - 7%
 - 3%
- Find the ratio of total Kinetic Energy in SHM when $x = A/3$, where (A) is amplitude.
 - 3/4
 - 4/3
 - 8/9
 - 9/8
- A solid cylinder is released from rest. Surface is rough enough for rolling on inclined plane of angle of inclination of $\theta = 60^\circ$. Find (a_{Com}) of the cylinder?
 - 10/3
 - $10/\sqrt{3}$
 - $10\sqrt{3}$
 - 5
- A capacitor of capacitance is $100\mu\text{F}$ is charged to a potential of 12V and 6.4 mH inductor is connected to it. Find maximum value of current.
 - 1.5 A
 20. A
 - 1.2 A
 - 3.2 A
- A galvanometer having coil resistance 10Ω shows a total scale deflection for current of 3mA. For it to measure a current of 8A the value of shunt should be
 - $2.75 \times 10^{-3}\Omega$
 - $3.75 \times 10^{-3}\Omega$
 - $3 \times 10^{-3}\Omega$
 - $4.85 \times 10^3\Omega$
- Given below are two statements.

Statement I : If a capillary tube is immersed first in cold water and then in hot water the height of capillary rise will be smaller in hot water

Statement II : If a capillary tube is immersed first in cold water and then in hot water capillary rise will be smaller in cold water.

 - Both statement I and statement II are correct.
 - Both statement I and statement II are incorrect.
 - Statement I is correct but statement II is incorrect.
 - Statement I is incorrect but statement II is correct.
- If A biconvex lens of refractive index 1.5 has a focal length of 20 cm in air. Its focal length when immersed in a liquid of refractive index 1.6 will be
 - +16 cm
 - +160 cm
 - 160 cm
 - 16cm
- If the ratio of centripetal acceleration of two particles moving on the same circular path is 3: 4. Find the ratio of their speed.
 - $2:\sqrt{3}$
 - $\sqrt{3}:2$
 - $\sqrt{3}:1$
 - $\sqrt{2}:1$
- If an object is having same weight at some distance d above and below the surface of earth. Find its distance from surface of earth.
 - $\frac{R}{2}$
 - $\frac{(\sqrt{5}-1)R}{2}$

$$(3) \frac{(\sqrt{3}-1)R}{2}$$

$$(4) (\sqrt{5}-1)R$$

11. A stationary hydrogen atom de excites from first excited state to ground state. The recoil speed of hydrogen atom is $n \times 10^8$ m/s. Find the value of n up to nearest integer value. (mass of hydrogen atom = 1.8×10^{-27} kg)

$$= 2$$

12. A body of mass 100 kg travelled 10m before coming to rest. If $\mu = 0.4$, work done against friction is (motion is happening on a horizontal surface, take $g = 10$ m/s²)

$$(1) 4500 \text{ J}$$

$$(2) 50000 \text{ J}$$

$$(3) 4200 \text{ J}$$

$$*(4) 4000 \text{ J}$$

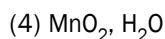
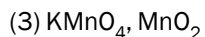
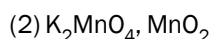
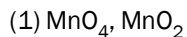
13. A solid sphere of radius 4a units is placed with its centre at origin. Two charges $-2q$ at $(-5a, 0)$ & $5q$ at $(3a, 0)$ is

placed. If the flux through the sphere is $\frac{xq}{\epsilon_0}$, find x?

$$= 5$$

CHEMISTRY

1. Which of the following pair will be formed by the decomposition of KMnO_4 .



Answer: (b) $\text{K}_2\text{MnO}_4, \text{MnO}_2$

Solution:

Potassium permanganate forms dark purple (almost black) crystals which are isostructural with those of KClO_4 . The salt is not very soluble in water (6.4 g / 100 g of water at 293 K), but when heated it decomposes at 513 K



2. Interaction between π Bond & lone pairs on adjacent atoms

(a) Resonance

(b) Hyper conjugation

(c) Inductive Effect

(d) Electronic Effect

Answer: (a) Resonance

3. **Assertion (A)** : Electronegativity increase across a period

Reason (R) : Effective increase in nuclear charge is more than effective shielding.

Solution: Assertion true reason true

4. S-1: Electronegativity increase down the group 14 is to pb

S-2: Group 14 contains metals, non metals and also metalloids

S-1 is incorrect but S-2 is correct

Column - I

Column - II

a) Ziegler Natta Catalyst

i) Rh

b) Blood Pigment

ii) CO

c) Wilkinson Catalyst

iii) Fe

d) Vitamin B₁₂

iv) Ti

	(a)	(b)	(c)	(d)
(1)	iv	iii	i	ii
(2)	iii	ii	i	iv
(3)	ii	iv	i	ii
(4)	i	ii	iii	iv

Key: 1

5. Appearance of Red colour on treatment with Na fusion extract of an organic compound with FeSO_4 in presence of conc. H_2SO_4 indicate element

a) N

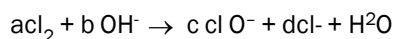
b) Br

c) S

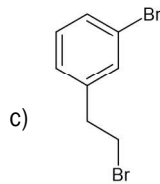
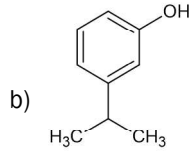
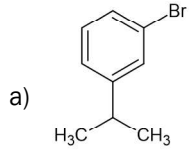
d) N & S

Answer: (d) N & S

6. Cl^- shows disproportionation in alkaline medium:



	(a)	(b)	(c)	(d)
(1)	1	1	1	3
(2)	3	6	2	4
3)	1	2	1	1



19. Number of compounds with central atom having lone pair of electrons.



20. The reactions taking place in temperature, the rate of overall reaction is given as $K = \frac{k_1 k_2}{k_3}$ then overall activate E_a for reaction, $E_{a_1} = 40 \text{ kg / mole}$, $E_{a_2} = 50 \text{ kg mole}$, $E_{a_3} = 60 \text{ kg / mole}$

21. Which of the following is correctly matches

- a) Cryolite - Na_3AlF_6
- b) Flurospar CaF_2
- c) Chloropatite - $3Ca_3(PO_4)_2 \cdot CaF_2$
- d) Carnalite $KCl \cdot MgCl_2 \cdot 6H_2O$

Key : 3

MATHEMATICS

1. If $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{x^2 \cos x}{1+e^x} + \frac{1+\sin^2 x}{1+e^{\sin x}} \right) dx = \frac{\pi}{2}(\pi + \alpha) - 4$ find

α .

Ans : -12

2. A position vector of A is $\vec{OA} = 2i + 2j + k$, $\vec{OB} = 2i + 4j + 4k$ Then angular bisector of $\angle AOB$ intersect AB at point C. Find \vec{OC} .

Ans : $\left(2, \frac{8}{3}, 2 \right)$

3. If $A \begin{bmatrix} 1 & 0 & 0 \\ 0 & \alpha & \beta \\ 0 & \beta & \alpha \end{bmatrix}$ and $|2A|^3 = 2^{21}$. Where $\alpha, \beta \in N$

Then (α, β) can be

Ans : (3,5)

4. Sum of all 64 terms of G.P is 7 times of odd terms then find common ratio.

Ans : $\frac{1}{7}$

5. Let a die rolled till 2 is obtained. The probability that 2 obtained on even numbered toss is equal to :

Ans : $\frac{5}{11}$

6. Find the common ratio of a G.P whose $a_6 = 2$ and $a_1 a_4 a_7$ is maximum.

Ans : $\frac{8}{5}$

7. If α, β are the roots of $x^2 - x + 2 = 0$ such that $\text{Im}(\alpha) > \text{Im}(\beta)$, find $\alpha^6 + \alpha^4 + \beta^4 - 5\alpha^2$

Ans : 13

8. Given $\triangle ABC$, $y=x$ is angle bisector of $\angle ABC$ $2x-y=2$ is equation if $AC(4,6)$ and (α, β) are A, B respectively, then $\alpha + 2\beta = ?$

9. Evaluate : $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\int_x^{(\frac{\pi}{2})^3} \cos t^{\frac{1}{3}} dt}{\left(x - \frac{\pi}{2}\right)^2}$

(1) $\frac{3\pi^2}{4}$

(2) $\frac{3\pi}{4}$

(3) $\frac{3\pi^2}{8}$

(4) $\frac{3\pi}{8}$

Ans : $\frac{3\pi^2}{8}$

10. $\frac{{}^{11}C_1}{2} + \frac{{}^{11}C_2}{3} + \dots + \frac{{}^{11}C_9}{10} = \frac{m}{n}$ The m+n is

Ans : 2041

11. Rank of the word 'GTWENTY' in dictionary is

Ans : 553

12. $\vec{a}, \vec{b}, \vec{c}$ are three non collinear vectors $\vec{a}, 6\vec{b}$, is collinear with $\vec{c}, \vec{b} + 5\vec{c}$ is collinear with \vec{a} . then $\vec{a} + \alpha\vec{b} + \beta\vec{c} = 0$ then find $\alpha + \beta = ?$

Ans : 36

13. If $f(x) = \int \frac{\operatorname{cosec} x + \sin x}{\operatorname{cosec} x \sec x + \tan x \sin^2 x} dx$

and $\lim_{x \rightarrow \frac{\pi}{2}} f(x) = 1$, then find $f\left(\frac{\pi}{4}\right) = ?$

14. Let A be square matrix such that $AA^T = I$. Then

$\frac{1}{2}A[(A+A^T)]^2 + (A-A^T)^2$ equal to

(1) $A^3 + A^T$

(2) $A^2 + A^T$

(3) $A^2 + I$

(4) $A^3 + I$.

Ans : $A^3 + A^T$

15. If $z = \frac{1}{2} - 2i$ such that

$|z+1| = \alpha z + \beta(1+i), i = \sqrt{-1}$ and $\alpha, \beta \in N$ then $\alpha + \beta$ is

Ans :

16. Let R be a relation on $Z \times Z$ defined by (a,b)(c,d) if ad-bc is divisible by 5 is what type of relation?

17. Domain of $f(x) = \frac{\log(x-1)}{\log_{x-1}(x-4)}$ is

Ans : (4, ∞)

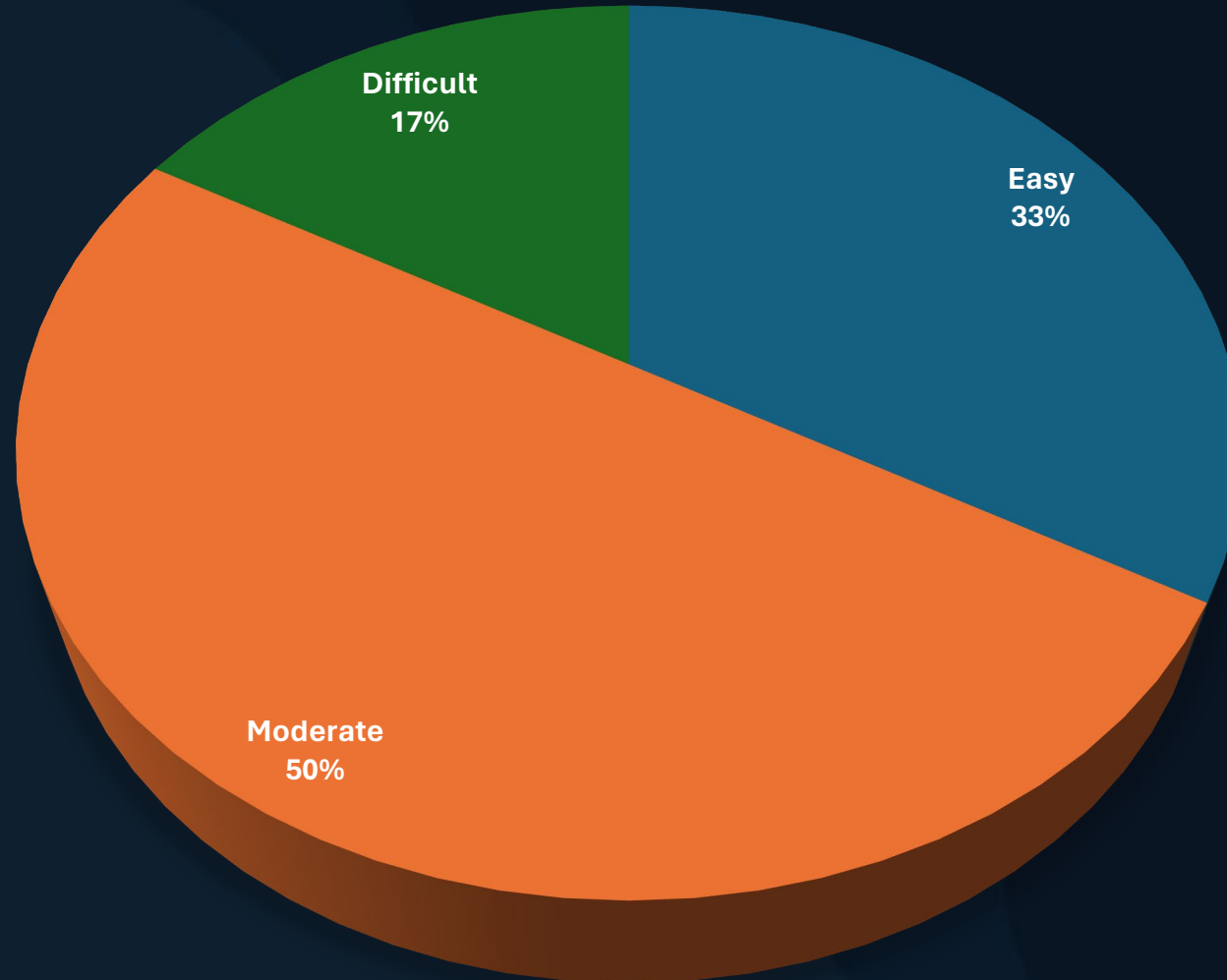
18. If $\frac{dy}{dx} - \left(\frac{\sin 2x}{1 + \cos^2 x}\right)y = \frac{\sin x}{1 + \cos^2 x}$ and $y(0)=0$ then

$y\left(\frac{\pi}{2}\right)$ is

Ans : 1

29th Jan. Shift – 1 Physics Analysis

Memory based Questions



29th Jan. Shift – 1 Physics Analysis

Memory based Questions

Chapter	Grade	No. of Questions	Difficulty Level
Units & Measurement	11	1	Easy
Motion in a straight line	11	1	Moderate
Motion in a plane	11	1	Easy
Laws of motion	11	2	Moderate, Easy
Work, energy and power	11	2	Moderate, Easy
System of particles and rotational motion	11	1	Moderate
Gravitation	11	1	Moderate
Mechanical properties of solids	11		
Mechanical properties of fluids	11	1	Moderate
Thermal properties of matter	11		

29th Jan. Shift – 1 Physics Analysis

Memory based Questions

Chapter	Grade	No. of Questions	Difficulty Level
Thermodynamics	11	1	Easy
Kinetic theory of gases	11	1	Easy
Oscillations	11	1	Easy
Waves	11		
Electrostatic potential and capacitance	12	1	Moderate
Electric charges and fields	12	1	Difficult
Current Electricity	12	2	Easy, Difficult
Moving charges and magnetism	12	1	Moderate
Magnetism and matter	12		
Electromagnetic induction	12	1	Moderate

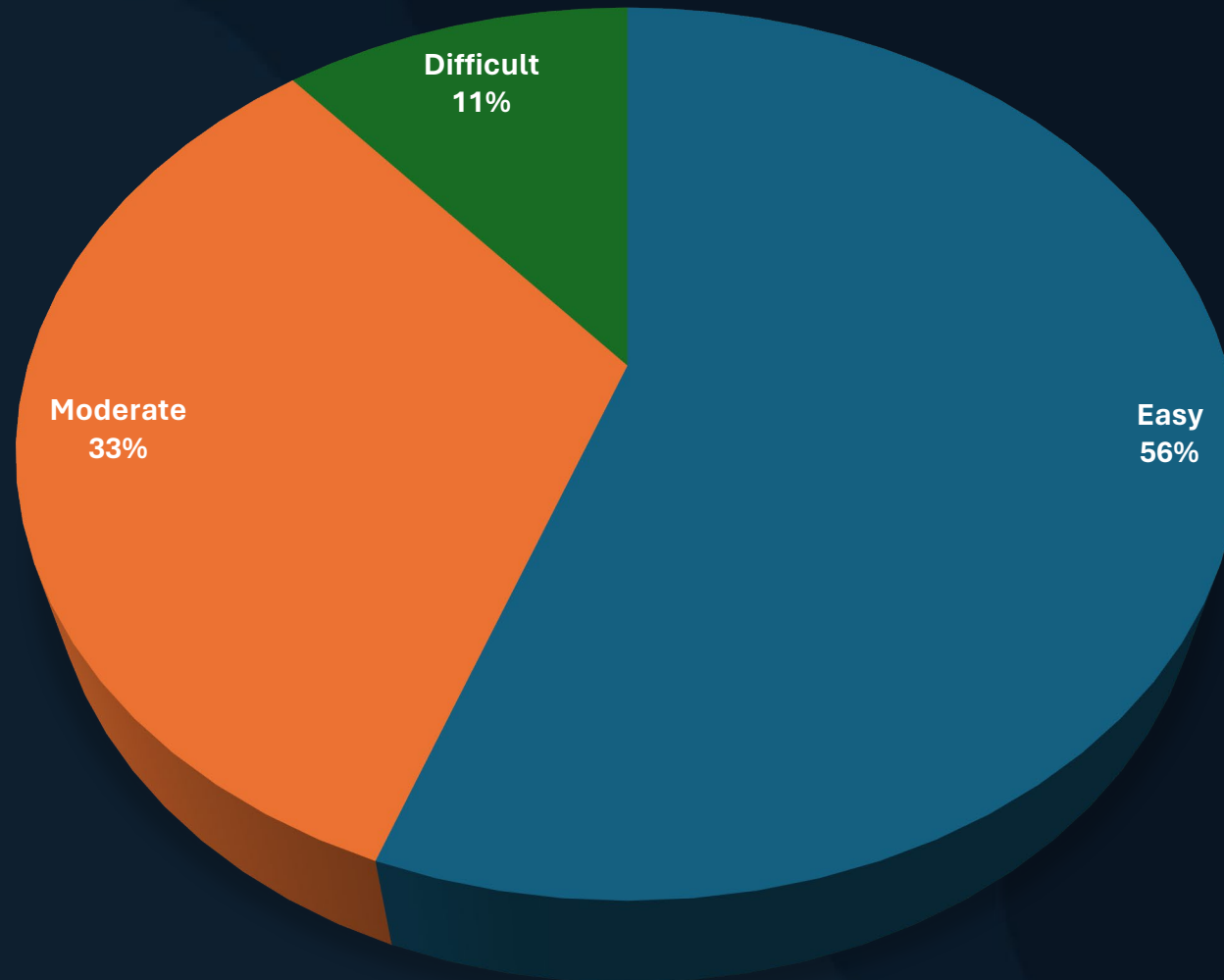
29th Jan. Shift – 1 Physics Analysis

Memory based Questions

Chapter	Grade	No. of Questions	Difficulty Level
Alternating Current	12	1	Difficult
Electromagnetic waves	12		
Ray optics and optical instruments	12	2	Moderate
Wave optics	12		
Dual nature of radiation and matter	12	1	Moderate
Atoms	12	1	Moderate
Nuclei	12		
Semiconductor electronics: Materials; devices and simple circuits	12		

29th Jan. Shift – 1 Maths Analysis

Memory based Questions



29th Jan. Shift – 1 Maths Analysis

Memory based Questions

Chapter	Grade	No. of Questions	Difficulty Level
Sets and Relations	11	1	Easy
Functions	11	1	Easy
Trigonometric Functions	11		
Principle of Mathematical Induction, Linear inequalities	11		
Quadratic Equations	11		
Complex Numbers	11	2	Easy
Permutations and Combinations	11	1	Easy
Binomial Theorem	11	1	easy
Sequences and Series	11	1	Moderate
Straight Lines	11	1	Moderate

29th Jan. Shift – 1 Maths Analysis

Memory based Questions

Chapter	Grade	No. of Questions	Difficulty Level
Circles	11		
Conic Section	11		
Limits and Derivatives	11		
Statistics	12		
Matrices	12	2	Easy
Determinants	12		
Inverse Trigonometric Functions	12		
Continuity and Differentiability	12		
Applications of Derivatives	12	1	Difficult
Indefinite Integration	12	1	Moderate

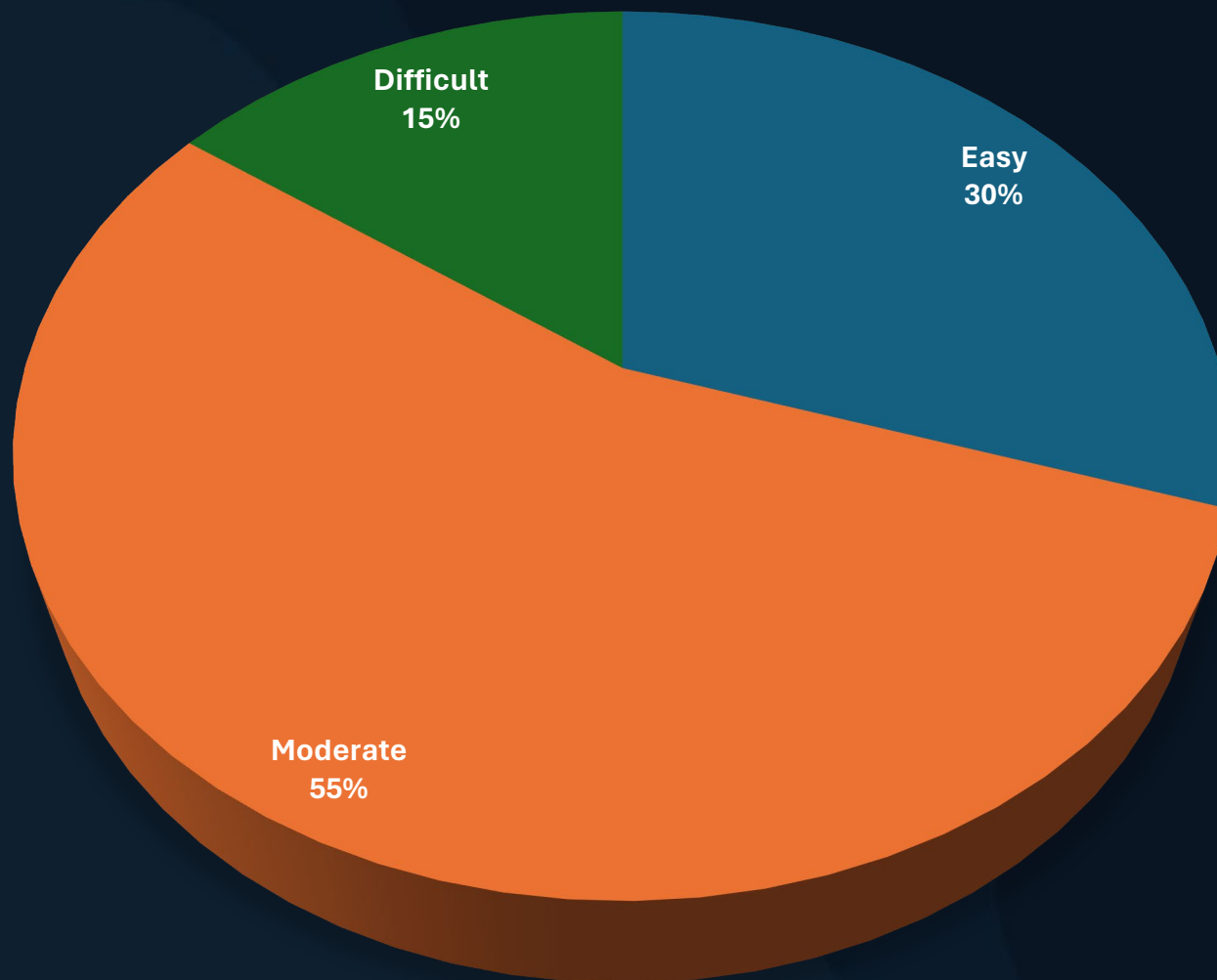
29th Jan. Shift – 1 Maths Analysis

Memory based Questions

Chapter	Grade	No. of Questions	Difficulty Level
Definite Integration	12	2	Moderate
Applications of Integrals	12		
Differential Equations	12		
Vectors Algebra	12	2	Easy
Three Dimensional Geometry	12		
Probability	12	1	Moderate
Trigonometric Equations	11		

29th Jan. Shift – 1 Chemistry Analysis

Memory based Questions



29th Jan. Shift – 1 Chemistry Analysis

Memory based Questions

Chapter	No. of Questions	Difficulty Level
Some basic concepts of chemistry	1	Moderate
Structure of Atom	1	Moderate
Periodic Classification		
Chemical bonding and molecular structure	3	Moderate, Easy
States of matter		
Thermodynamics		
Equilibrium		
Redox reactions	3	Moderate, Easy
p - block elements	2	Easy
Hydrocarbons	2	Difficult, Moderate

29th Jan. Shift – 1 Chemistry Analysis

Memory based Questions

Chapter	No. of Questions	Difficulty Level
Solution		
Electrochemistry	1	Moderate
Chemical kinetics	1	Moderate
General principles and processes of isolation of elements		
d & f block elements	1	Moderate
Coordination compounds	1	Moderate
Haloalkanes and Haloarenes	1	Difficult
Alcohol, Phenol Ether	2	Moderate
Aldehyde, Ketone, Carboxylic acid		
Amines		

29th Jan. Shift – 1 Chemistry Analysis

Memory based Questions

Chapter	No. of Questions	Difficulty Level
Biomolecule	1	Easy
Organic Chemistry- Some basic principles and techniques (General Organic)	2	Easy
Salt Analysis		

HISTORY CREATED

SRI CHAITANYA STUDENTS SECURE TOP RANKS in JEE ADVANCED 2023

ALL-INDIA OPEN CATEGORY RANKS

ALL INDIA



1

RANK

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2

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3

RANK

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4

RANK

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7

RANK

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