

Sri Chaitanya IIT Academy.,India.

✪ A.P ✪ T.S ✪ KARNATAKA ✪ TAMILNADU ✪ MAHARASTRA ✪ DELHI ✪ RANCHI

A right Choice for the Real Aspirant

ICON Central Office - Madhapur - Hyderabad

Sec: **Sr.Super60_NUCLEUS & STERLING_BT**

Paper -1(Adv-2021-P1-Model)

Date: 24-09-2023

Time: 09.00Am to 12.00Pm

RPTA-08

Max. Marks: 180

24-09-2023_Sr.Super60_NUCLEUS&STERLING_BT_Jee-Adv(2021-P1)_RPTA-08_Syllabus

PHYSICS

: Rigid body Dynamics 2: Conservation of angular momentum; Collision of point masses with rigid bodies, Rolling with and without slipping, Toppling

CHEMISTRY

: 1.Classification of Elements and Periodicity in Properties:

Modern periodic law and the present form of periodic table; electronic configuration of elements; periodic trends in atomic radius, ionic radius, ionization enthalpy, electron gain enthalpy, valence, oxidation states, electronegativity and chemical reactivity.

2. Chemical bonding and Molecular Structure:

Orbital overlap and covalent bond; Hybridisation involving s, p and d orbitals only(Excluding Hybridisation in complexes); Molecular orbital energy diagrams for homo nuclear diatomic species (upto Ne₂); Hydrogen bond; Polarity in molecules, dipole moment; VSEPR model and shapes of molecules (linear, angular, triangular, square planar, pyramidal, square pyramidal, trigonal bipyramidal, tetrahedral and octahedral).

3.Hydrogen: Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides –ionic, covalent and interstitial; physical and chemical properties of water, heavy water; hydrogen peroxide-preparation, reactions, uses and structure; hydrogen as a fuel; hardness of water

MATHEMATICS : Vectors & 3D-Geometry

Name of the Student: _____

H.T. NO:

--	--	--	--	--	--

**JEE-ADVANCE-2021-P1-Model**

Time:3Hr's

IMPORTANT INSTRUCTIONS

Max Marks: 180

PHYSICS:

Section	Question Type	+Ve Marks	- Ve Marks	No.of Qs	Total marks
Sec – I(Q.N : 1 – 4)	Questions with Single Correct Choice	+3	-1	4	12
Sec – II(Q.N : 5 – 10)	Paragraph Questions with Numerical Value Answer Type	+2	0	6	12
Sec – III(Q.N : 11 – 16)	Questions with Multiple Correct Choice with partial mark	+4	-2	6	24
Sec – IV(Q.N : 17 – 19)	Questions with Non-negative Integer Value Type	+4	0	3	12
Total				19	60

CHEMISTRY:

Section	Question Type	+Ve Marks	- Ve Marks	No.of Qs	Total marks
Sec – I(Q.N : 20 – 23)	Questions with Single Correct Choice	+3	-1	4	12
Sec – II(Q.N : 24 – 29)	Paragraph Questions with Numerical Value Answer Type	+2	0	6	12
Sec – III(Q.N : 30 – 35)	Questions with Multiple Correct Choice with partial mark	+4	-2	6	24
Sec – IV(Q.N : 36– 38)	Questions with Non-negative Integer Value Type	+4	0	3	12
Total				19	60

MATHEMATICS:

Section	Question Type	+Ve Marks	- Ve Marks	No.of Qs	Total marks
Sec – I(Q.N : 39 – 42)	Questions with Single Correct Choice	+3	-1	4	12
Sec – II(Q.N : 43 – 48)	Paragraph Questions with Numerical Value Answer Type	+2	0	6	12
Sec – III(Q.N : 49 – 54)	Questions with Multiple Correct Choice with partial mark	+4	-2	6	24
Sec – IV(Q.N : 55 – 57)	Questions with Non-negative Integer Value Type	+4	0	3	12
Total				19	60





PHYSICS

Max Marks: 60

SECTION – I

(SINGLE CORRECT ANSWER TYPE)

This section contains 4 multiple choice questions. Each question has 4 options (A), (B), (C) and (D) for its answer, out of which ONLY ONE option can be correct.

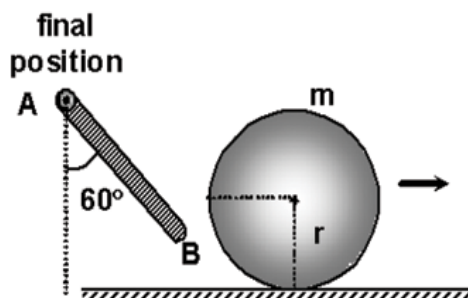
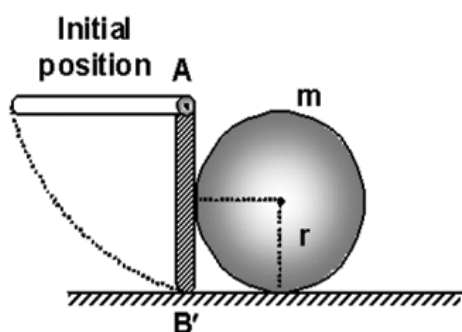
Marking scheme: +3 for correct answer, 0 if not attempted and –1 in all other cases. Section 1 (Max Marks: 12)

- Section 1 contains Four questions
- Each Question has Four Options and Only One of these four will be the correct answer.
- For each question, choose the option corresponding to the correct answer
- The Marking scheme to evaluate Answer to each question will be :
- Full Marks: +3 (If the answer is correct)
- Zero Marks: 0 (If the question is unanswered)
- Negative Marks: -1 (In all other cases)

1. A uniform rod AB of mass M is attached to a hinge at one end A, and released from the horizontal position. The rod rotates about A, and when it reaches the vertical position the rod strikes a sphere of mass m and radius r initially at rest on the smooth horizontal surface as shown in the adjacent figure. The impact is along the horizontal direction and perfectly elastic.

If at the moment of impact, the lowest end of the rod is very close to the smooth horizontal surface. After the impact, the sphere moves along the horizontal and the rod, subsequently rises to a maximum of 60° with the vertical. Choose the correct statement(s) from the following, taking into account the information given above. The length of the

rod equals $\sqrt{2} r \left(r = \frac{6\sqrt{2}}{10} m \right)$ (take $g = 10 \text{ m/s}^2$)

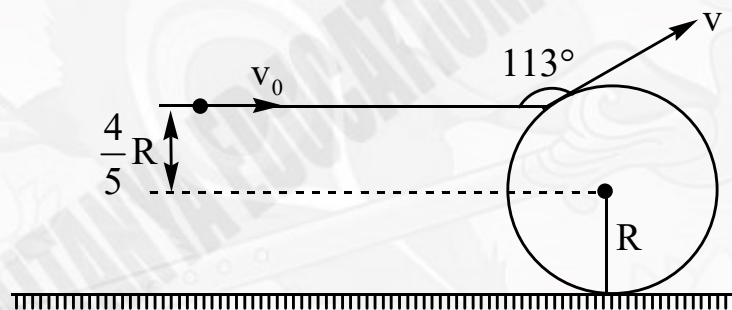


- A) The ratio M/m is $3/2$ B) The ratio m/M is $2/3$
 C) The ratio m/M is $2/9$ D) The ratio m/M is $9/2$

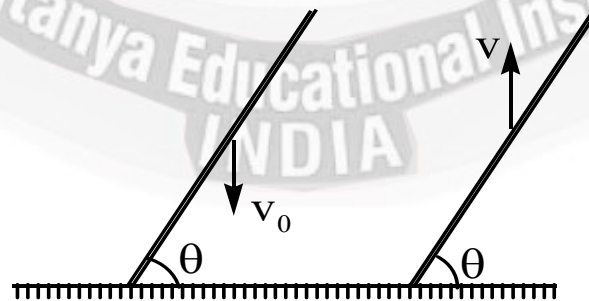




2. A solid cube is placed on rough horizontal surface. The coefficient of friction between them is μ , where $\mu < \frac{1}{2}$. A variable horizontal force is applied on the cube's upper face perpendicular to one edge and passing through midpoint of that edge. The maximum acceleration with which it can move without toppling is
[Acceleration due to gravity 'g']
- A) μg B) $2\mu g$ C) $g[1-2\mu]$ D) $\left[\frac{1}{2}-\mu\right]g$
3. A smooth sphere of radius R is fixed on a horizontal surface. A steel ball, moving horizontally with velocity $v_0 = 5\sqrt{gR}$, collides with the sphere, changes its direction and moves with velocity v as shown. Then



- A) $4\sqrt{2}v_0 = 5\sqrt{3}v$ B) $8v_0 = 5\sqrt{3}v$ C) $5v_0 = 8\sqrt{3}v$ D) $v = v_0$
4. A uniform rod of length L , moving down with linear velocity v_0 and zero angular velocity, collides with a horizontal surface. Just after collision, the linear velocity of its centre of mass becomes v in the upward direction as shown in the figure. The angular velocity of the rod just after the impact is





A) $\frac{6(v - v_0)\cos\theta}{L}$

B) $\frac{2(v_0 + v)\cos\theta}{3L}$

C) $\frac{3(v - v_0)\cos\theta}{2L}$

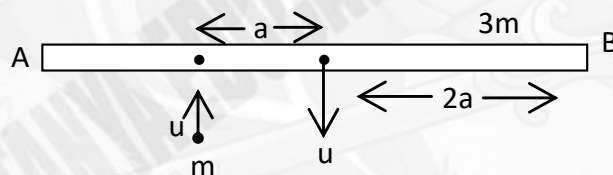
D) $\frac{6(v_0 + v)\cos\theta}{L}$

SECTION 2

- This section contains **THREE (03)** questions stems.
- There are **TWO (02)** questions corresponding to each question stem.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value corresponding to the answer in the designated place using the mouse and the on-screen virtual numeric keypad.
- If the numerical value has more than two decimal places, **truncate/round-off** the value to **TWO** decimal places.
- Answer to each question will be evaluated according to the following marking scheme:
- **Full Marks: +2** If ONLY the correct numerical value is entered at the designated place;
- **Zero Marks:0** in all other cases

Question Stem for Question Nos. 5 and 6**Question Stem**

A rod AB of mass $3m$ and length $4a$ is falling freely in a horizontal position. At an instant when its speed is u , a particle of mass m collides with the rod elastically with speed u as shown in the figure.



5. If V_1 is the magnitude value of velocity of the centre of mass of the rod just after the collision, then the ratio $\left(\frac{V_1}{u}\right)$ is equal to
6. If V_2 is the magnitude value of velocity of the particle just after the collision, then the ratio $\left(\frac{V_2}{u}\right)$ is equal to

Question Stem for Question Nos. 7 and 8**Question Stem**

Two uniform circular disc plates A and B are mounted co-axially on a vertical axle. The discs have moments of inertia I and $2I$ respectively about the common axis. Disc A is imparted an initial angular velocity 2ω . Disc B is imparted an angular velocity ω . Both the discs rotate in the clockwise direction

7. When disc B is brought in contact with disc A, they acquire a common angular velocity in time t . The average frictional torque on one disc by the other during this period is $K \left(\frac{I\omega}{t}\right)$ find K



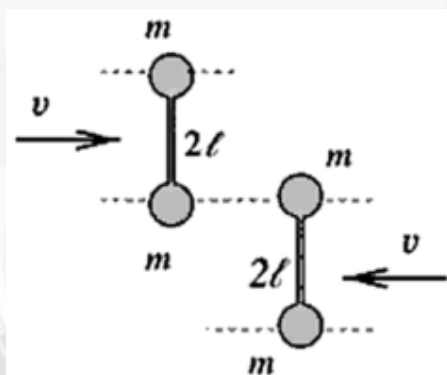


8. The loss of kinetic energy during the above process is $x(I\omega^2)$. Find X.

Question Stem for Question Nos. 9 and 10

Question Stem

Two identical dumb-bells AB and CD move towards each other with same speed ' v ' on a horizontal smooth table as shown in the figure. Each can be considered as two-point masses m joined by a weightless rod of length $2l$. Initially, they are not rotating. During the motion elastic collision occur first between B and C, then sometime later between A and D. (Take $V=5 \text{ m/s}$ & $L=2 \text{ m}$).



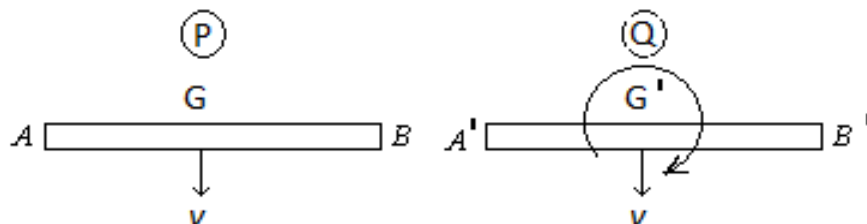
9. The angular velocity of each dumb-bell just after the first collision in (rad/s) is
10. If first collision occurs at $t = 0$ and second collision occurs at $t = t$ sec, then the value of t (in sec) is

SECTION 3

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme:
- Full Marks: +4** If only (all) the correct option(s) is (are) chosen;
- Partial Marks: +3** If all the four options are correct but **ONLY** three options are chosen,
- Partial Marks: +2** If three or more options are correct but **ONLY** two options are chosen, both of which are correct;
- Partial Marks: +1** If two or more options are correct but **ONLY** one option is chosen and it is a correct option;
- Zero Marks: 0** If unanswered;
- Negative Marks: -2** In all other cases.
- For example, in a question, if (A), (B) and (D) are the **ONLY** three options corresponding to the correct answer, then
 Choosing **ONLY** (A), (B) and (D) will get +4 marks;
 Choosing **ONLY** (A), will get +1 mark;
 Choosing **ONLY** (B), will get +1 mark;
 Choosing **ONLY** (D), will get +1 mark;
 Choosing no option(s) (i.e. the question is unanswered) will get 0 marks and
 Choosing any other option(s) will get -2 marks.

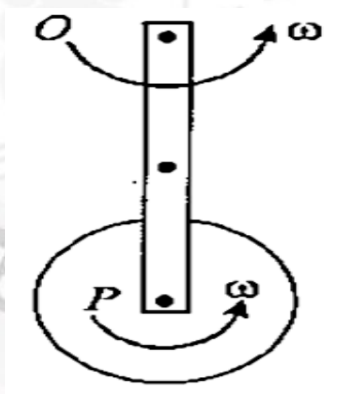
11. Two equal uniform rods P and Q each of length l move with the same velocity v as shown in the figure. The second rod has an angular velocity $\omega (< 6v/l$ and clockwise) about its centre of gravity G^1 in addition to v .





- A) If the ends A and A' are suddenly fixed simultaneously, both the rods will start to rotate with the same angular velocity.
- B) If the ends A and A' are suddenly fixed simultaneously, the rod Q will start to rotate with greater angular velocity.
- C) If the ends B and B' are suddenly fixed simultaneously, both rods will start to rotate with the same angular velocity.
- D) If the ends B and B' are suddenly fixed simultaneously, the rod P will start to rotate with greater angular velocity.

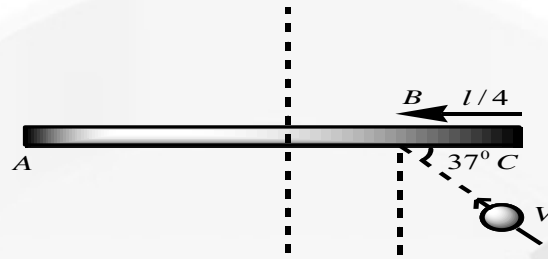
12. A rod of mass m and length $2R$ can rotate about an axis passing through O in vertical plane. A disc of mass m and radius $\frac{R}{2}$ is hinged to the other end P of the rod and can freely rotate about P . When disc is at lowest point both rod and disc has angular velocity ω . If rod rotates by maximum angle $\theta = 60^\circ$ with downward vertical, then ω in terms of R and g will be (all hinges are smooth)



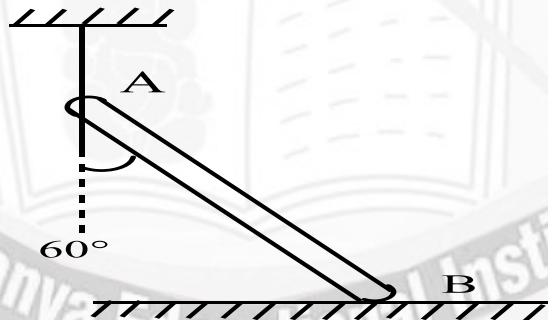
- A) $\sqrt{\frac{9g}{16R}}$ B) $\sqrt{\frac{3g}{23R}}$ C) $\frac{1}{3}\sqrt{\frac{g}{R}}$ D) $\sqrt{\frac{g}{R}}$



13. A rod AC Of length ℓ and mass m is kept on a horizontal smooth plane. It is free to rotate and move. A particle of same mass m moving on the plane with velocity v strikes rod at point B making angle 37° with the rod. The collision is elastic. After collision:



- A) The angular velocity of the rod will be $\frac{72V}{55\ell}$
- B) The centre of the rod will travel a distance $\frac{\pi\ell}{3}$ in the time in which it makes half rotation.
- C) Impulse of the impact force is $\frac{24mV}{55}$
- D) The centre of the rod will travel a distance $\frac{\pi\ell}{8}$ in the time in which it makes $1/4^{\text{th}}$ rotation
14. A rod of mass 'm' lengths 'l' is in equilibrium in the position shown. The ground is rough enough to prevent slipping.

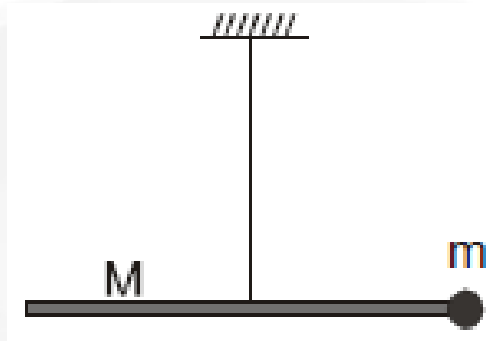


- A) The normal force N_1 at B is $\frac{mg}{2}$ (Before cutting the string)
- B) The normal force N_2 at B immediately after cutting the string is $\frac{7mg}{16}$
- C) The friction force at point B is $\frac{\sqrt{3}mg}{16}$ after cutting
- D) The friction force at point B is zero before cutting the string.

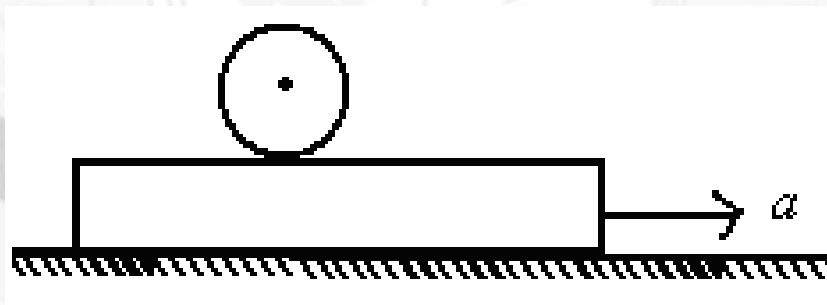




15. A particle of mass m is attached to an end of a uniform rod of mass $M = 2m$ and length ' l ' which is suspended through its mid point by an inextensible string as shown. Initially the rod is in horizontal position and at rest. The system is released from this position. Just after the release.



- A) The angular acceleration of the system is $\frac{6g}{5l}$
 B) The angular acceleration of the system is $\frac{2g}{5l}$
 C) The tension in the string is $\frac{12}{5}mg$
 D) The tension in the string is $\frac{2}{5}mg$
16. A uniform solid cylinder is placed on a horizontal board. The coefficient of friction between them is 0.3. The board is imparted a constant acceleration of $a = 6m/s^2$ in a horizontal direction at right angles of the cylindrical axis. Then (take $g = 10m/s^2$)



- A) The acceleration of the cylinder axis in the absence of slipping will be $1.5m/s^2$.
 B) The acceleration of the cylinder axis in the absence of slipping will be $2m/s^2$
 C) The limiting value of ' a ' for which there will be no slipping is $12m/s^2$
 D) The limiting value of ' a ' for which there will be no slipping is $9m/s^2$





SECTION 4

- This section contains **THREE (03)** question.
- The answer to each question is a **NON-NEGATIVE INTEGER**.
- For each question, enter the correct integer corresponding to the answer the using the mouse and the on-screen virtual numeric keypad in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme:
- **Full Marks** : +4 If ONLY the correct integer is entered;
- **Zero Marks** : 0 In all other cases.

17. A hollow straight tube of length L and mass m can turn freely about its centre normal to its length on a smooth horizontal table. Another smooth uniform rod of same length and mass is fitted into the tube so that their centers coincide. The system is set in motion with an initial angular velocity ω_0 . The angular velocity of the rod at an instant when the rod slips out of the tube is ω_0/k . Find the value of k
18. A thin uniform rod of length L is initially at rest on a smooth horizontal surface. The rod is tapped at one end perpendicular to its length. The centre of mass translate by $\frac{\pi L}{x}$ while the rod completes one revolution about its centre of mass? Neglect gravitational effect. Find the value of x
19. A uniform hollow sphere of radius 30 cm is released from rest on a rough inclined plane. The friction is sufficient to prevent any slipping. Find the angular velocity (in rad/s) of the sphere, when its center of mass descends through a vertical height of 3 cm.
 $(g = 10 \text{ m/s}^2)$





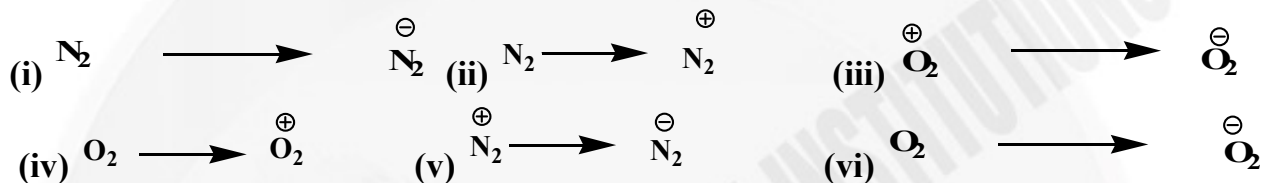
CHEMISTRY

Max. Marks: 60

SECTION 1

- This section contains **Four (04)** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme:
- Full Marks : +3 If ONLY the correct option is chosen;
- Zero Marks : 0 If the none of the options is chosen (i.e. the question is unanswered);
- Negative Marks: -1 In all other cases.

20. In which of the following process, the value of magnetic moment does not change?



A) (i) and (ii) B) (iii) and (v) C) (iii) and (iv) D) (v) and (ii)

21. Which of the following molecules / ions can exist?

A) H_4S B) OF_4 C) KHF_2 D) BeF_5^{-3}

22. Which of the following element have electron affinity greater than 'F'.

A) O B) S C) Se D) Cl

23. Match the species with their respective ionic size

	Column – I		Column - II
P	Mg^{+2}	1	1.26\AA^0
Q	O^{-2}	2	1.16\AA^0
R	F^{-}	3	1.19\AA^0
S	Na^{+}	4	0.72\AA^0

A) P-4; Q-1; R-2; S-3 B) P-1; Q-4; R-2; S-3

C) P-2; Q-3; R-1; S-4 D) P-4 ; Q-1; R-3; S-2;

SECTION 2

- This section contains **THREE (03)** questions stems.
- There are **TWO (02)** questions corresponding to each question stem.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value corresponding to the answer in the designated place using the mouse and the on-screen virtual numeric keypad.
- If the numerical value has more than two decimal places, **truncate/round-off** the value to **TWO** decimal places.
- Answer to each question will be evaluated according to the following marking scheme:
- Full Marks : +2 If ONLY the correct numerical value is entered at the designated place;
- Zero Marks : 0 In all other cases.

Question Stem for Question Nos. 24 and 25

Sec: Sr.Super60_NUCLEUS & STERLING_BT

Space for rough work

Page 11



Sri Chaitanya Educational Institutions



THE PERFECT HAT-TRICK WITH ALL- INDIA RANK 1
IN JEE MAIN 2023 JEE ADVANCED 2023 AND NEET 2023

JEE MAIN
2023
SINGARAJU
VENKAT KUMARINNYA
Sri Chaitanya
Educational Institutions
300
300



RANK
1

JEE Advanced
2023
VAVILALA
CHANDRASEKHAR REDDY
Sri Chaitanya
Educational Institutions
341
360



RANK
1

NEET
2023
BORLA VARUN
CHANDRASEKHAR
Sri Chaitanya
Educational Institutions
720
720



RANK
1

Question Stem

According to the following information



$\Delta H_{eg}[A^+(g)] = -350 \text{ KJ / mole}$ where ΔH_{eg} is electron gain enthalpy.

For $A(g)$ $IE_1 + IE_2$ value is equal to 950 KJ / mole.

24. The value of the ΔH_{eg} of $A^{+2}(g)$ in KJ / mole is $-a$. Then find the value of $\frac{a}{120}$ in KJ / mole.
25. The value of IE_1 of $A^-(g)$ is x KJ / mole and IE of $A^+(g)$ is y KJ / mole. The hydration energy of $A^{+2}(g)$ is $-Z$ KJ / mole. Then the value of $\left(\frac{x+y}{z}\right)$ is equal to _____

Question Stem for Question Nos. 26 and 27

Question Stem

In the poly atomic molecules the bond energy of similar bond may differ due to the difference in the chemical environment around central atom. Bond order is given by the number of bonds between the two atoms in a molecule. Iso electronic molecules and ions will have identical bond orders. In general as bond order increases the bond energy increases and bond length decreases.

26. In the following the number species are having less bond order than O_2^+ and paramagnetic.
 $CN^-, CO, N_2^+, N_2^-, O_2, O_2^-, O_2^{+2}, F_2, CO^+$
27. In the following the number of species with fractional bond order is/are
 $H_2^+, H_2, H_2^-, He_2, He_2^+, B_2, C_2, O_2, O_2^+, O_2^-, O_3, BF_3, CO_3^{+2}, C_6H_6$ (Only C – C bond)

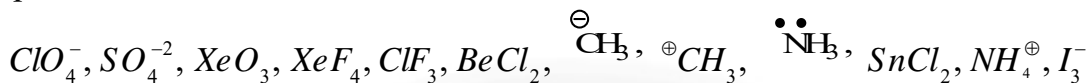
Question Stem for Question Nos. 28 and 29

Question Stem

In AB_nE_x type molecules, as the electronegativity of A increases, the bond pairs come closer towards the central atom and the repulsion between them increases. On the other hand as electronegativity of B increases, the bond pairs get farther and repulsion decreases (A,B are the different elements A is the central atom and B is the bonded atom and E=number of lone pairs)

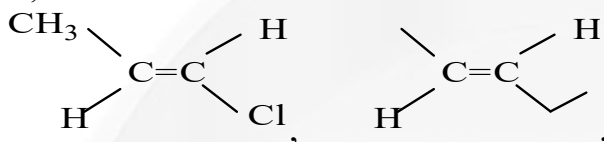


28. In the following how many species are orientation of hybrid orbitals and shape of species is same.



29. In the following, how many species with dipole moment zero.

1, 2 - dichloro benzene, 1, 3 - dichloro benzene
1, 4 - dichloro benzene, cis - 2 - butene, Trans - 2 - butene



1, 4 - dihydroxybenzene, 1, 4 - dicyanobenzene

SECTION 3

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme:
- Full Marks: +4** If only (all) the correct option(s) is (are) chosen;
- Partial Marks: +3** If all the four options are correct but **ONLY** three options are chosen,
- Partial Marks: +2** If three or more options are correct but **ONLY** two options are chosen, both of which are correct;
- Partial Marks: +1** If two or more options are correct but **ONLY** one option is chosen and it is a correct option;
- Zero Marks: 0** If unanswered;
- Negative Marks: -2** In all other cases.
- For example, in a question, if (A), (B) and (D) are the **ONLY** three options corresponding to the correct answer, then
Choosing **ONLY** (A), (B) and (D) will get +4 marks;
Choosing **ONLY** (A), will get +1 mark;
Choosing **ONLY** (B), will get +1 mark;
Choosing **ONLY** (D), will get +1 mark;
Choosing no option(s) (i.e. the question is unanswered) will get 0 marks and
Choosing any other option(s) will get -2 marks.

30. Which of the following molecules/ions has unpaired electrons in antibonding molecular orbitals?

A) NO B) O_2 C) O_2^+ D) O_2^-

31. Which combination of compounds, their geometry and hybridization is correct?

A) XeOF_4 – Square pyramidal, sp^3d^2 B) BF_4^- – Tetrahedral, sp^3

C) SF_4 – see - saw, sp^3d D) ICl_2^- – linear, sp^3d

32. Most ionic compounds have

A) High melting point and low boiling points.
B) High melting points and non – directional bonds
C) Three dimensional array structures and are good conductors of electricity in their molten state.
D) High solubility's in polar solvents and low solubility in non – polar solvents.





33. In which of the following sets of elements having more similarities in their properties is/are
- A) S, Na B) Li, Mg C) Be, Al D) Zr, Hf
34. Which of the following is / are correct relation? (in general)
- A) Bond energy \propto (polarity of the bond)¹
- B) Bond energy \propto (S – character of hybrid orbitals)
- C) Bond energy \propto (Atomic radius)⁻¹
- D) Bond energy \propto (Bond order)¹
35. Select the Amphoteric oxides?
- A) BeO B) Al₂O₃ C) ZnO D) As₂O₃

SECTION 4

- This section contains **THREE (03)** question.
- The answer to each question is a **NON-NEGATIVE INTEGER**.
- For each question, enter the correct integer corresponding to the answer the using the mouse and the on-screen virtual numeric keypad in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme:
- **Full Marks : +4** If ONLY the correct integer is entered;
- **Zero Marks : 0** In all other cases.

36. Number of lone pair – bond pair repulsion at 90° are P in ICl₂⁻.
Number of lone pair – bond pair repulsion at 90° are Q in ICl₄⁻.
Find the difference of Q and P.
37. Bond distance in HF is $9.17 \times 10^{-11} \text{ m}$. Dipole moment of H – F observed is $6.004 \times 10^{-30} \text{ C m}$.
The percentage of ionic character in HF will be \times . Then $\frac{\times}{10}$ value is ____ (rounding to the nearest integer)
38. The number of elements among the following atomic numbers that are P – block elements is / are ____
83, 79, 42, 64, 37, 54, 34, 28, 17, 46, 48, 38, 08.

THE PERFECT HAT-TRICK WITH ALL- INDIA RANK 1
 IN JEE MAIN 2023 JEE ADVANCED 2023 AND NEET 2023

JEE MAIN 2023	RANK	JEE Advanced 2023	RANK	NEET 2023	RANK
SINGARAJU VENKAT KUMARDHINIA	1	VADILALA CHIRUVILAS REDDY	1	BORR VARUN CHIRUVAJANTI	1
300		341		720	
300		360		720	



MATHEMATICS

Max. Marks: 60

SECTION 1

- This section contains **Four (04)** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme:
- Full Marks : +3 If ONLY the correct option is chosen;
- Zero Marks : 0 If the none of the options is chosen (i.e. the question is unanswered);
- Negative Marks : -1 In all other cases.

39. Let A, B, C, D are four coplanar points in 3D – space and $3\overline{OA} + 2\overline{OB} - 4\overline{OC} + \lambda\overline{OD} = \overline{0}$
Then the ratio made by \overline{AB} on the join of \overline{CD} is
A) 5 : 4 B) 1 : 4 C) 1 : 1 D) 4 : 5
40. Let A (0, 0, 0), B (1, 1, 1), C (1, -1, 1) then the circum radius of the ΔABC , is _____
A) $\frac{2\sqrt{2}}{3}$ B) $\frac{1}{2}$ C) $\frac{3}{\sqrt{2}}$ D) $\frac{3}{2\sqrt{2}}$
41. Which of the following is/are FALSE?
A) Let $\vec{a}, \vec{b}, \vec{c}$ are three non-coplanar vectors and $\vec{r} \cdot \vec{a} = \vec{r} \cdot \vec{b} = \vec{r} \cdot \vec{c} = 0$ then $\vec{r} = \vec{0}$.
B) If $\vec{a}, \vec{b}, \vec{c}$ are three non-coplanar vectors then $(\vec{a} \times \vec{b}) + (\vec{b} \times \vec{c}) + (\vec{c} \times \vec{a})$ and $\vec{a} + \vec{b} + \vec{c}$ are perpendicular
C) If $\vec{a} \cdot \vec{c} = 0$ then $\vec{a} \times (\vec{b} \times \vec{c}), (\vec{a} \times \vec{b}) \times \vec{c}$ are perpendicular
D) If $\vec{a}, \vec{b}, \vec{c}, \vec{d}$ are four coplanar vectors then $(\vec{a} \times \vec{b}) \times (\vec{c} \times \vec{d}) = \vec{0}$
42. The plane containing the line $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-2}{1}$ making maximum distance from O (0, 0, 0) is “p” Then “ $6p^2$ ” = _____
A) 5 B) 1 C) 8 D) 4

SECTION 2

- This section contains **THREE (03)** questions stems.
- There are **TWO (02)** questions corresponding to each question stem.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value corresponding to the answer in the designated place using the mouse and the on-screen virtual numeric keypad.
- If the numerical value has more than two decimal places, **truncate/round-off** the value to **TWO** decimal places.
- Answer to each question will be evaluated according to the following marking scheme:
- Full Marks: +2 If ONLY the correct numerical value is entered at the designated place;
- Zero Marks: 0 In all other cases.

Question Stem for Question Nos. 43 and 44

**Question Stem**

$$\vec{U} = i + j + k, \vec{V} = ai + bj + ck \quad (\vec{V} \text{ is non zero vector})$$

(where i, j, k are unit orthogonal vectors)

Here $a, b, c \in \{-2, -1, 0, 1, 2\}$

43. Total number of possible \vec{V} , such that $\vec{U} \cdot \vec{V} = 0$

44. Total number of possible \vec{V} , such that $\vec{U} \times \vec{V} = \vec{0}$

Question Stem for Question Nos. 45 and 46**Question Stem**

Let $\vec{i}, \vec{j}, \vec{k}$ are unit vectors along three positive co-axes,

$$\vec{a} = 3\vec{i} + \vec{j} - \vec{k}, \vec{b} = \vec{i} + b_2\vec{j} + b_3\vec{k}, \vec{c} = c_1\vec{i} + c_2\vec{j} + c_3\vec{k}, \vec{a} \cdot \vec{b} = 0 \text{ and}$$

$$\begin{bmatrix} 0 & -c_3 & c_2 \\ c_3 & 0 & -c_1 \\ -c_2 & c_1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ b_2 \\ b_3 \end{bmatrix} = \begin{bmatrix} 3-c_1 \\ 1-c_2 \\ -1-c_3 \end{bmatrix} \text{ Then}$$

45. The value of $\vec{b} \cdot \vec{c} = \dots$

46. The maximum value of $\frac{13}{2}|c|^2 = \dots$

Question Stem for Question Nos. 47 and 48**Question Stem**

Let ABCD is a unit sided Regular tetrahedron let 'P' be any point on the sphere circumscribing the tetrahedron then

47. The value of $144(\text{volume of the tetrahedron } ABCD)^2 = \dots$

48. The value of $PA^2 + PB^2 + PC^2 + PD^2 = \dots$

SECTION 3

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme:
- **Full Marks** : +4 If only (all) the correct option(s) is (are) chosen;
- **Partial Marks** : +3 If all the four options are correct but **ONLY** three options are chosen,
- **Partial Marks** : +2 If three or more options are correct but **ONLY** two options are chosen, both of which are correct;
- **Partial Marks** : +1 If two or more options are correct but **ONLY** one option is chosen and it is a correct option;
- **Zero Marks** : 0 If unanswered;
- **Negative Marks** : -2 In all other cases.
- For example, in a question, if (A), (B) and (D) are the **ONLY** three options corresponding to the correct answer, then

Choosing ONLY (A), (B) and (D) will get +4 marks;

Choosing ONLY (A), will get +1 mark;

Choosing ONLY (B), will get +1 mark;

Choosing ONLY (D), will get +1 mark;

Choosing no option(s) (i.e. the question is unanswered) will get 0 marks and

Choosing any other option(s) will get -2 marks.





49. Let $\overrightarrow{OA} = \vec{a}, \overrightarrow{OB} = \vec{b}, \overrightarrow{OC} = \vec{c}, \overrightarrow{OD} = \vec{d}$ and $\tan \alpha \vec{a} + 2 \tan \beta \vec{b} + 2 \tan \gamma \vec{c} = \vec{d}$, also the points A, B, C, D are coplanar then which of the following options is/are correct?
- A) The maximum value of $\tan^2 \alpha + \tan^2 \beta + \tan^2 \gamma = \frac{1}{4}$
- B) The minimum value of $\tan^2 \alpha + \tan^2 \beta + \tan^2 \gamma = \frac{1}{9}$
- C) At the time of $\tan^2 \alpha + \tan^2 \beta + \tan^2 \gamma = \frac{1}{9}$ then $|\tan \alpha + \tan \beta + \tan \gamma| = \frac{5}{9}$
- D) At the time of $\tan^2 \alpha + \tan^2 \beta + \tan^2 \gamma = \frac{1}{4}$ then $|\tan \alpha + \tan \beta + \tan \gamma| = \frac{5}{4}$
50. Consider Three planes
 $ax + by + cz = 0, bx + cy + az = 0, cx + ay + bz = 0$ and $A = (a + b + c),$
 $B = (a^2 + b^2 + c^2 - ab - bc - ca)$
 which of the following options is/are correct?
- A) If $A = 0, B = 0$ then the locus of (x, y, z) lie on a straight line
- B) If $A = 0, B \neq 0$ then the locus of (x, y, z) lie on a straight line
- C) If $A \neq 0, B = 0$ then the locus of (x, y, z) lie on a plane
- D) If $A \neq 0, B \neq 0$ then the locus of (x, y, z) lie on a plane
51. Let PQRS be a unit Square folded along the Diagonal \overline{PR} , so that 'Q' Reaches at Q^1 and planes PRQ^1, PRS are perpendicular to one other then which of the following options is/are correct?
- A) $|QQ^1| = \frac{1}{\sqrt{2}}$
- B) $|QQ^1| = 1$
- C) Shortest distance between $\overline{PQ^1}, \overline{RS} = \sqrt{\frac{2}{3}}$
- D) Shortest distance between $\overline{PQ^1}, \overline{RS} = \frac{2}{\sqrt{3}}$
52. Consider a unit cube with the edges has its line segments of unit length then which of the following options is/are correct?





- A) The maximum value of the minimum distance between any two edges of a cube is 1 unit
- B) The maximum value of the minimum distance between any two edges of a cube is $\sqrt{2}$ unit
- C) The maximum value of the minimum distance between any two face diagonals of the cube is 1 unit
- D) The maximum value of the minimum distance between any two face diagonals of the cube $\sqrt{2}$ unit

53. Let $\triangle ABC$ is fixed triangle with area = 1 (unit)². let points M,N,P are taken on $\overline{AB}, \overline{BC}, \overline{CA}$ respectively such that $\frac{AM}{AB} = \frac{BN}{BC} = \frac{CP}{CA} = \lambda$ ($\lambda > 0$) then which of the following options is/are correct?

A) $\overrightarrow{AN} + \overrightarrow{BP} + \overrightarrow{CM} = \vec{0}$

B) The area of the triangle $\triangle MNP$ always equal to $\frac{1}{4}$

C) The minimum area of the triangle formed by the vectors $\overrightarrow{AN}, \overrightarrow{BP}, \overrightarrow{CM}$ is $\frac{1}{4}$

D) $0 \leq \lambda \leq 1$

54. Let $\frac{x-5}{3} = \frac{y-7}{-1} = \frac{z+2}{1}$, $\frac{x+3}{-3} = \frac{y-3}{2} = \frac{z-6}{4}$ Two lines l_1, l_2 respectively then

A) Two points P, Q on l_1 , two points R, S on l_2 then \overline{PQ} can never be parallel to \overline{RS}

B) Two points P, Q on l_1 , two points R, S on l_2 then \overline{PQ} can be perpendicular to \overline{RS}

C) A line l_3 with D.R.S 2 : 7 : -5 meet the lines l_1, l_2 at (2, 8, -3) and (0, 1, 2)

D) D.R.S of the line along the skew-distance of the lines l_1, l_2 is 2 : 5 : -1

SECTION 4

- This section contains **THREE (03)** question.
- The answer to each question is a **NON-NEGATIVE INTEGER**.
- For each question, enter the correct integer corresponding to the answer the using the mouse and the on-screen virtual numeric keypad in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme:
- **Full Marks** : +4 If ONLY the correct integer is entered;
- **Zero Marks** : 0 In all other cases.





55. Let \vec{a}, \vec{b} non-collinear vectors, $\vec{a} \cdot \vec{b} \neq 0$, and

$$\vec{a} \times (\vec{a} \times \dots \times (\vec{a} \times (\vec{a} \times \vec{b}))) = -|\vec{a}|^k (\vec{a} \times \vec{b})$$

In the left hand side of the equation we

consider \vec{a} in 2023 times then $|k - 2022| = \underline{\hspace{2cm}}$

56 let $\vec{a}, \vec{b}, \vec{c}$ Three unit vectors then the maximum value of $|\vec{a} - \vec{b}|^2 + |\vec{b} - \vec{c}|^2 + |\vec{c} - \vec{a}|^2$

57. The locus of the centroid of a tetrahedron of constant volume '64c.c' formed by three co-ordinate planes and a variable plane is ' $xyz = \lambda$ ' then the value of ' λ ' =





Sri Chaitanya

Junior Colleges & Coaching Centres



VAVILALA CHIDVILAS REDDY
HT.NO. 236165088
Sri Chaitanya
6th - 12th Class

RANK

WITH ALL INDIA **RANK 1** IN JEE ADVANCED 2023

SRI CHAITANYA

STANDS AT THE TOP

SEIZES 5 RANKS IN TOP 10 IN ALL-INDIA OPEN CATEGORY

ANDHRA PRADESH STATE TOPPER



8th - 12th Class
Sri Chaitanya

RAMESH SURYA TEJA
HT.NO. 236131371

RANK



AITS Student

KALRA RISHI
HT.No. 237047209

RANK



9th - 12th Class
Sri Chaitanya

RAGHAV GOYAL
HT.No. 237020329

RANK



4th - 12th Class
Sri Chaitanya

BIKINA ABHINAV CHOWDARY
HT.No. 236163128

RANK

32 TOP RANKS BELOW 100 IN ALL-INDIA OPEN CATEGORY



RANK
12

DASARI SAKETH NAIDU
HT.No. 236060148



RANK
14

GUTHIKONDA ABHIRAM
HT.No. 236120121



RANK
17

P GNANA KOUSIK REDDY
HT.No. 236133520



RANK
18

D VENKATA YUGESH
HT.No. 236040359



RANK
19

MOULIK JINDAL
HT.No. 237020004



RANK
22

D PRATAP SINGH
HT.No. 232008139



RANK
23

SHAIK SAHIL CHANDA
HT.No. 236122870



RANK
26

SONI MAYANK
HT.No. 232097025



RANK
33

GOYAL NAMAN
HT.No. 232029349



RANK
37

SUMEDH SS
HT.No. 231025088



RANK
38

V DEERAJ SATHVIK REDDY
HT.No. 236057151



RANK
44

V VERGIYA KAUSHAL
HT.No. 231004058



RANK
46

SUTHAR HARSHAL
HT.No. 231005062



RANK
58

ABHI JAIN
HT.No. 232091036



RANK
61

RIDAM JAIN
HT.No. 232068021



RANK
62

SUTHAR HARSH
HT.No. 232100028



RANK
63

SOJITRA DIPEN
HT.No. 231017001



RANK
65

D PANENDRANADHA REDDY
HT.No. 232060298



RANK
67

GUNDA SUSHANTH
HT.No. 236129722



RANK
68

HARSH TAYA
HT.No. 237021776



RANK
69

KRISH GUPTA
HT.No. 232068189



RANK
73

KUNCHAKURTHY VIVEK
HT.No. 239334263



RANK
81

N DHARMA TEJA REDDY
HT.No. 236050138



RANK
84

S VENKAT KOUNDINYA
HT.No. 239330679



RANK
87

MRUNAL SHRIKANT
HT.No. 231041338



RANK
92

SAMOTA APURVA
HT.No. 232099210



RANK
97

N PRINCE BRANHAM REDDY
HT.No. 236064112

BELOW
20 »
All India Open
Category Ranks

10
RANKS (50%)

BELOW
100 »
All India Open
Category Ranks

32

BELOW
1000 »
All India Open
Category Ranks

181

BELOW
100 »
All India
Category Ranks
Count

89

BELOW
1000 »
All India
Category Ranks
Count

699

NUMBER OF RANKS QUALIFIED
3,621*

ADMISSIONS OPEN » JEE ADVANCED LONG-TERM 2024

040 66 06 06 06



Scan QR Code for
JEE Advanced Offers