Sri Chaitanya IIT Academy.,India.

A.P T.S KARNATAKA TAMILNADU MAHARASTRA DELHI RANCHI

A right Choice for the Real Aspirant

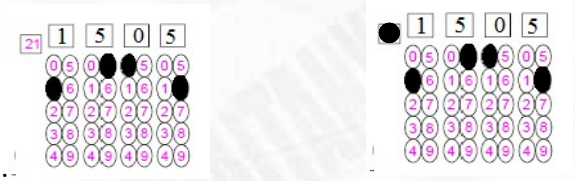
ICON Central Office - Madhapur - Hyderabad

SEC: Sr.Super60_STERLING BT	**JEE-MAIN**	**Date: 05-07-2025**
Time: 09:00AM to 12:00PM	**QMT-12**	**Max. Marks: 300**

IMPORTANT INSTRUCTION:

1. Immediately fill in the Admission number on this page of the Test Booklet with **Blue/Black** Ball Point **Pen** only.
2. The candidates should not write their Admission Number anywhere (except in the specified space) on the Test Booklet/ Answer Sheet.
3. The test is of **3 hours** duration.%
4. The Test Booklet consists of **75 Questions.** The maximum marks are **300.**
5. There are **three** parts in the question paper 1,2,3 consisting of **Mathematics, Physics** and **Chemistry** having **25 Questions** in each subject and subject having **two sections.**
   (I) Section –I contains **20 Multiple Choice Questions** with only one correct option.
   Marking scheme: +4 for correct answer, **0** if not attempt and **-1** in all other cases.
   (II) Section-II contains **05 Numerical Value Type Questions.**
   - The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11).**

   To cancel any attempted question bubble on the question number box.
   For example: To cancel attempted Question 21. Bubble on 21 as shown below



   Question Answered for Marking Question Cancelled for Marking
   Marking scheme: +4 for correct answer, **0** if **not attempt** and **-1** in all other cases.
6. Use **Blue / Black Point Pen only** for writing particulars / marking responses on the Answer Sheet. **Use of pencil is strictly prohibited.**
7. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electron device etc, except the Identity Card inside the examination hall.
8. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
9. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Hall. **However, the candidate are allowed to take away this Test Booklet with them.**
10. **Do not fold of make any stray marks on the Answer Sheet**

Name of the Candidate (in Capital): _____

Admission Number: | | | | | | | | | |

Candidate's Signature:_____ **Invigilator's Signature:** _____

05-07-25_Sr.Super60_STERLING BT_Jee-Main_QMT-12_Test Syllabus

MATHEMATICS : TOPICS COVERED FROM 20TH MAY 2024 TO 21ST JUNE 2025 -50% + PRESENT WEEK 50% up to 30-Jun-2025 to 03-Jul-2025

PHYSICS : 50% ON SYLLABUS COVERED FROM 20-05-2024 TO 27-06-25 & 50 % ON 30-06-2025 TO 04-07-2025

CHEMISTRY : TOPICS COVERED FROM 20TH MAY 2024 TO 27TH JUNE 2025 -50% + PRESENT WEEK 50% up to 30-Jun-2025 to 03-Jul-2025

MATHEMATICS

Max Marks: 100

SECTION-I (SINGLE CORRECT ANSWER TYPE)

This section contains **20 Multiple Choice Questions.** Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and –1 in all other cases.

1. Let $f(x)=8x^2-\log_e x,\ x>0$ be a decreasing function in (0, a) and increasing in (a, 4). The tangent to parabola $y^2=8ax$ at a point P on it passes through $(16a, 16a-1)$ but not through $\left(-\frac{1}{2a},0\right)$. The equation of normal at P is

   1) $4x+y=36$ 2) $9x+4y=36$ 3) $x+4y=9$ 4) $9x+y=4$

2. Match the following lists:

	LIST - I		LIST – II
I)	Image of the point (3, 5, 7) in the plane $2x+y+z=-18$ is	P)	$(-1,-1,-1)$
II)	The point of intersection of the line $\frac{x-2}{-3}=\frac{y-1}{-2}=\frac{z-3}{2}$ and the plane $2x+y-z=3$ is	Q)	$(-21,-7,-5)$
III)	The foot of the perpendicular from the point (1, 1, 2) to the plane $2x-2y+4z+5=0$	R)	$\left(\frac{23}{10},\frac{6}{5},\frac{14}{5}\right)$
IV)	The intersection point of the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-4}{5}=\frac{y-1}{2}=z$	S)	$\left(-\frac{1}{12},\frac{25}{12},\frac{-2}{12}\right)$

   Choose the correct option which is given below:

   1) I-Q; II-R; III-P; IV-P 2) I-Q; II-R; III-P; IV-S

   3) I-Q; II-R; III-S; IV-P 4) I-Q; II-P; III-R; IV-S

3. A hyperbola passes through the foci of the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ and its transverse and conjugate axes coincide with major and minor axes of the ellipse, respectively. If the product of their eccentricities is one, then the equation of the hyperbola is

   1) $\frac{x^2}{9}-\frac{y^2}{16}=1$ 2) $x^2-y^2=9$ 3) $\frac{x^2}{9}-\frac{y^2}{4}=1$ 4) $\frac{x^2}{9}-\frac{y^2}{25}=1$

4. Let a differentiable function f satisfy $f(x)+\int_3^x \frac{f(t)}{t}dt=\sqrt{x+1},\ x\geq 3$.

   Then $12f(8)$ is equal to

   1) 34 2) 19 3) 17 4) 1

5. Let the area (in sq. units) of the region $\{(x,y): 2y \le x^2+3,\ y+|x| \le 3 \text{ and } y \ge |x-1|\}$ be A then 6A is equal to

1) 16 2) 12 3) 18 4) 14

6. If $24\int_0^{\frac{\pi}{4}}\left(\sin\left|4x-\frac{\pi}{12}\right|+[2\sin x]\right)dx = 2\pi+\alpha$, where [.] denotes the greatest integer function, then α is equal to

1) 12 2) 21 3) 42 4) 32

7. The common tangents of the parabola $y^2=8x$ and circle $x^2+y^2-12x+4=0$ meet at a point P. The sum of distances of P from the directrix and focus of the parabola is

1) 8 2) 12 3) 4 4) 6

8. STATEMENT – I: The number of positive integral solutions of the equation $x_1x_2x_3x_4x_5 = 1050$ is 1874

STATEMENT – II: The total number of divisor of 1050 is 25

1) Both STATEMENTS are true 2) Both STATEMENTS are false
3) Only STATEMENT- I is true 4) Only STATEMENT-II is true

9. The number of integral solution of the equation $x_1x_2x_3x_4 = 210$ is

1) 4^4 2) 6.4^4 3) 8.4^4 4) 10.4^4

10. Let $S=\left\{x: \cos^{-1}x = \pi + \sin^{-1}x + \sin^{-1}(2x+1)\right\}$ then $\sum_{x\in S}(2x-1)^2$ is equal to

1) 55 2) 5 3) 62 4) 6

11. Let $\vec{a},\vec{b},\vec{c}$ be three vectors of magnitude 2, 3, 5 respectively, satisfying $\left|\left[\vec{a}\vec{b}\vec{c}\right]\right| = 30$. If $(2\vec{a}+\vec{b}+\vec{c}).((\vec{a}\times\vec{c})\times(\vec{a}-\vec{c})+\vec{b}) = k$, then the value of $\left(\frac{k}{103}\right)$ is

1) 1 2) 2 3) 3 4) 4

12. The number of selections of four letters from the letters of the word ASSASSINATION, is

1) 72 2) 71 3) 66 4) 52

13. The number of seven-digit positive integers formed using the digits 1, 2, 3and 4 only and sum of the digits equal to 12 is
1) 403 2) 462 3) 413 4) 723

14. There is a regular decagon. By joining 4 vertices of it, a quadrilateral is formed. Then, the number of such quadrilaterals that can be formed, none of the sides of which coincide with a side of the decagon, is
1) 25 2) 35 3) 44 4) 65

15. In the coming IPL-2026 cricket tournament, there will be 10 teams, which are divided equally in to two groups. Teams of each group will play a match against each other. From each group 3 top teams will qualify for quarter finals. In this round each team will play against others once. Four top teams of this round will quality for semi-finals where each team will play against the others once. Two top teams of this round will go to the finals. Where they will play the best of three matches, then the minimum number of matches in the IPL 2026 is
1) 44 2) 43 3) 41 4) 50

16. The maximum number of points of intersection of 6 straight lines and 6 circles is
1) 117 2) 110 3) 72 4) 82

17. Let N be the number of integral solution of the equation $x+y+z+w=15$ where $x\geq 0, y>5, z\geq 2$ *and* $w\geq 1$ Find the unit digit of N.
1) 1 2) 2 3) 3 4) 4

18. A natural number n has prime factorization given by $n=2^x.3^y.5^z$ where y and z are such that $y+z=5$ and $y^{-1}+z^{-1}=\frac{5}{6}, y>z$. Then the number of odd divisors of n, incuding 1 is
1) 12 2) 6 3) 11 4) 13

19. Let the determinant of a square matrix A of order m be m – n, where m and n satisfy $4m+n=22$ *and* $17m+4n=93$. If $\det(n\ adj(adj(mA)))=3^a5^b6^c$, then a + b + c is equal to
1) 101 2) 96 3) 109 4) 84

20. If n is a prime number then the number of ordered pairs (x, y) satisfying $\frac{1}{x}+\frac{1}{y}=\frac{1}{n}(n\in N)$ is
1) 4 2) 3 3) 7 4) 12

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions.** The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases.

21. There are 5 students in class 10, 6 students in class 11 and 8 students in class 12. If the number of ways, in which 10 students can be selected from them so as to include at least 2 students from each class and at most 5 students from the total 11 students of class 10 and 11 is 100 k, then k is equal to _____

22. The number of ordered triplets (x, y, z) satisfying the inequality, $(1+\sin^4 x)(2+\cot^2 y)(4+\sin 4z) \le 12\sin^2 x$, Where $x, y, z \in [0, 2\pi]$ is _____

23. If the constant term in the expansion of $(1+2x-3x^3)\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$ is p; then 108p is equal to

24. Let $S = \{z \in \mathbb{C} : |z-3| \le 1 \text{ and } z(4+3i) + \bar{z}(4-3i) \le 24\}$. If $\alpha + i\beta$ is the point in S which is closest to 4i, then $25(\alpha+\beta)$ is equal to _____

25. If $\int \frac{1}{\sqrt[5]{(x-1)^4(x+3)^6}}dx = A\left(\frac{\alpha x-1}{\beta x+3}\right)^B + C$, where C is the constant of integration, then the value of $\alpha + \beta + 20AB$ is _____

PHYSICS **Max Marks: 100**

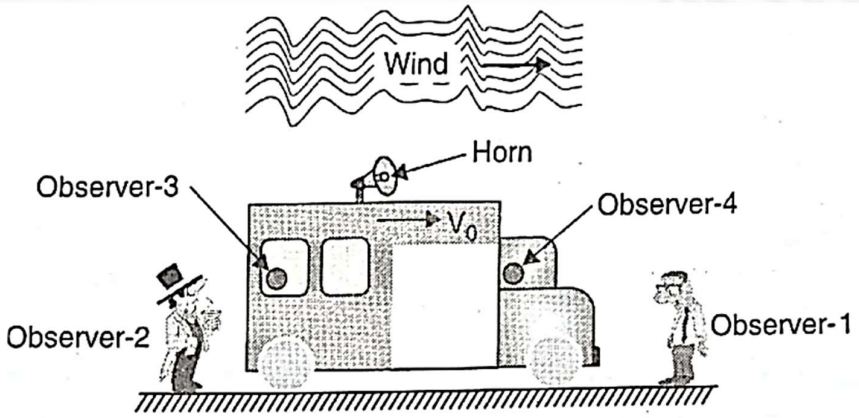
SECTION-I (SINGLE CORRECT ANSWER TYPE)

This section contains **20 Multiple Choice Questions.** Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and –1 in all other cases.

26. Figure shows a car moving towards right. Wind is blowing in the direction of motion of car. Car emits a horn of frequency f_0, velocity of sound is C. Velocity of wind is small as compared to source. Position of horn is assumed to be midway between observer 3 and 4. Source and all listeners are assumed to be along same line and sound waves are plane waves. Four observers have been shown in diagram.

Match COLUMN-I with COLUMN-II.



	List - I		List – II
I)	observer – 1	P)	wavelength received from horn is more than $\frac{C}{f_0}$
II)	observer-2	Q)	wavelength received from horn is less than $\frac{C}{f_0}$
III)	observer-3	R)	frequency received from horn is greater than f_0
IV)	observer-4	S)	frequency received from horn is smaller than f_0
		T)	frequency received from horn is equal to f_0

Choose the correct option given below:

1) I-QR; II-PS; III-PT; IV-QT
2) I-QR; II-PT; III-PS; IV-QT
3) I-PT; II-PS; III-QT; IV-QR
4) I-PS; II-QR; III-QT; IV-PT

27. Statement-I: Although the surfaces of goggle lenses are curved, it does not have any power.

Statement-II: In case of goggle, both are curved surfaces have equal radii of curvature and have center of curvature on the same side.

A) Statement-I is True, Statement-II is True. Statement-II is a correct explanation for Statement-I

B) Statement-I is True, Statement-II is True. Statement-II is NOT a correct explanation for Statement-I

C) Statement-I is True, Statement-II is False.

D) Statement-I is False, Statement-II is True.

1) A 2) C 3) D 4) B

28. Statement-I: The focal length of a lens does not depend on the medium in which it is submerged.

Statement-II: $\frac{1}{f}=\frac{\mu_2-\mu_1}{\mu_1}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$

A) Statement-I is True, Statement-II is True. Statement-II is a correct explanation for Statement-I

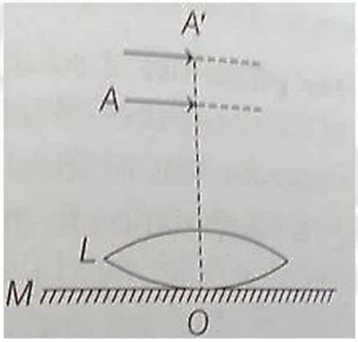
B) Statement-I is True, Statement-II is True. Statement-II is NOT a correct explanation for Statement-I

C) Statement-I is True, Statement-II is False.

D) Statement-I is False, Statement-II is True.

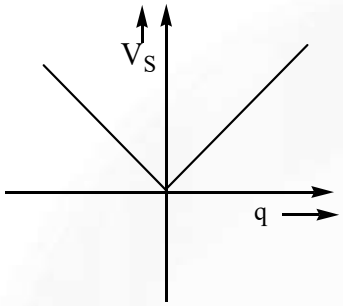
1) C 2) A 3) B 4) D

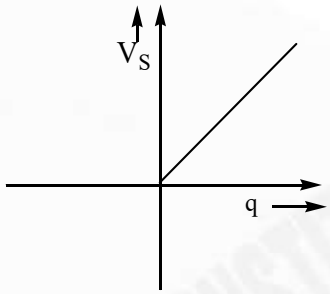
29. A thin convex lens L (refractive index =1.5) is placed on a plane mirror M. When a pin is placed at A, such that OA=18 cm, its real inverted image is formed at A itself, as shown in figure. When a liquid of refractive index μ_1 is put between the lens and the mirror, the in has to be moved to A^1, such that $OA^1=27cm$, to get its inverted real image at A^1 itself. The value of μ_1 will be

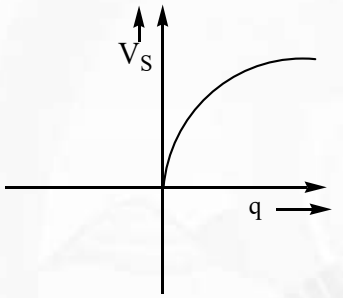


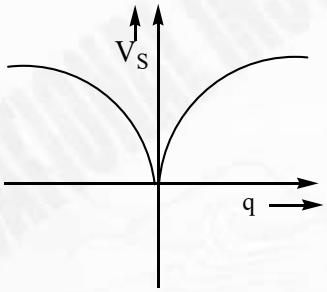
1) $\sqrt{3}$ 2) $\sqrt{2}$ 3) $\frac{4}{3}$ 4) $\frac{3}{2}$

30. A negative charge Q is distributed uniformly in volume of a sphere of radius R and a point charge particle (may be negative or positive) is present on the surface of this sphere then the variation of escape velocity of (v_s) charge 'q' as a function of 'q' will be [neglect gravitational interaction]

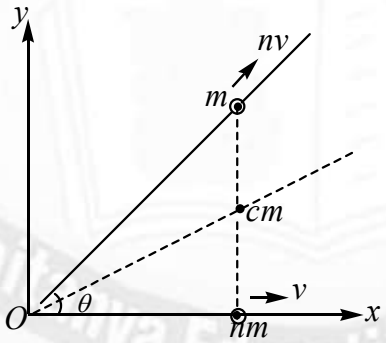
1) 

2) 

3) 

4) 

31. Two masses, nm and m, start simultaneously from the intersection of two straight lines with velocities v and nv respectively. It is observed that the path of their centre of mass is a straight line bisecting the angle between the given straight lines. Find the magnitude of the velocity of centre of mass. [Here θ (angle between the lines) $= 60°$ & $v = \sqrt{3} ms^{-1}$]



1) $\frac{3n}{(n+1)}$ 2) $\frac{\sqrt{3}n}{n+1}$ 3) $\frac{3n}{4n+1}$ 4) $\frac{\sqrt{3}n}{4n+1}$

32. An inductor L and a resistor R are connected in series with a direct current source of e.m.f. E. The maximum rate at which energy is stored in the magnetic field is

1) $\frac{E^2}{4R}$ 2) $\frac{E^2}{R}$ 3) $\frac{4E^2}{R}$ 4) $\frac{2E^2}{R}$

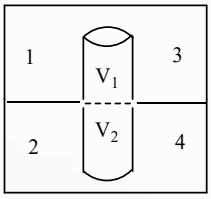
33. An eye specialist prescribes spectacles having combination of convex lens of focal length 40 cm in contact with a concave lens of focal length 25 cm. The power of this lens combination in diopters is

1) +1.5 2) -1.5 3) +6.67 4) -6.67

34. STATEMENT-I: When a body floats such that its parts are immersed into two immiscible liquids, then force exerted by liquid 1 is of magnitude $\rho_1 V_1 g$

STATEMENT-II: Total buoyant force $= \rho_1 V_1 g + \rho_2 V_2 g$

Where V_1 and V_2 are volumes



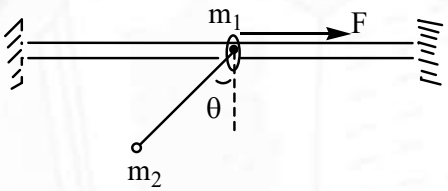
1) STATEMENT-I is true, STATEMENT-II is true and STATEMENT-II is a correct explanation for STATEMENT-I

2) STATEMENT-I is true, STATEMENT-II is true and STATEMENT-II is not a correct explanation for STATEMENT-I

3) STATEMENT-I is true, STATEMENT-II is false

4) STATEMENT-I is false, STATEMENT-II is true

35. A horizontal force F pulls a ring of mass m_1 such that θ remains constant with time. The ring is constrained to move along a smooth rigid horizontal wire. A bob of mass m_2 hangs from m_1 by an inextensible light string. Then match the entries of COLUMN-I with that of COLUMN-II



	COLUMN I		COLUMN II
I)	F	P)	$(m_1+m_2)g$
II)	Force acting on m_2 is	Q)	$m_2 g \sec\theta$
III)	Tension in the string is	R)	$m_2 \dfrac{F}{m_1+m_2}$
IV)	Force acting on m_1 by the wire is	S)	$(m_1+m_2)g\tan\theta$

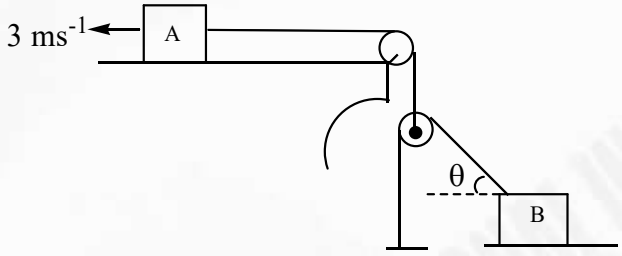
Choose the correct option from the below given options:

1) I→S; II-R; III-Q; IV-P 2) I→S; II-Q; III-R; IV-P

3) I→R; II-Q; III-P; IV-S 4) I→P; II-Q; III-R; IV-S

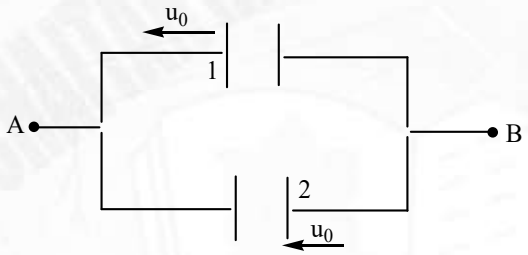
36. A diminished image of an object is to be obtained on a screen 1.0 m from it. This can be Achieved by placing
1) a plane mirror 2) a convex mirror of focal length 1m
3) a convex lens of focal length less than 0.25 m
4) a concave lens of focal length 1m

37. In the figure shown, the lower pulley is free to move in a vertical direction only. Block A is given a uniform velocity $3ms^{-1}$ as shown, what is the velocity of block B at an instant if $\theta = 30°$



1) $3\sqrt{3}ms^{-1}$ 2) $\sqrt{3}ms^{-1}$ 3) $3ms^{-1}$ 4) $9ms^{-1}$

38. Two identical capacitors having plate separation d_0 are connected parallel to each other across points A and B as shown in figure. A charge Q is imparted to the system by connecting a battery across A and B and battery is removed. Now first plate of first capacitor and second plate of second capacitor starts moving with constant velocity u_0 towards left. Find the magnitude of current flowing in the loop during this process



1) $\frac{Qu_0}{2d_0}$ 2) $\frac{2Qu_0}{d_0}$ 3) $\frac{Qu_0}{d_0}$ 4) $\frac{Qu_0}{4d_0}$

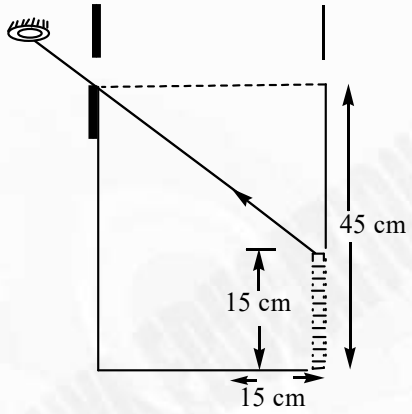
39. A thin cylindrical rod of length 10 cm is placed horizontally on the principal axis of a concave mirror of focal-length 20 cm. The rod is placed in such a way that midpoint of the rod is at 40cm from the pole of mirror. The length of the image formed by the mirror will be x/3 cm. The value of x is…..
1) 32 2) 16 3) 248 4) 64

40. A convex lens is in contact with concave lens. The magnitude of the ratio of their focal length is $\frac{3}{2}$. Their equivalent focal length is 30 cm. What are their individual focal lengths?
1) -75, 50 2) -10, 15 3) 75,50 4) -15,10

41. The image of an object , formed by a plano-convex lens at a distance of 8 m behind the lens, is real and is one-third of the size of the object. The wavelength of light inside the lens is $2/3$ times the wavelength in free space. The radius of the curved surface of the lens is

1) 1 m 2) 2 m 3) 3 m 4) 6 m

42. An observer can see through a small hole on the side of a jar (radius 15 cm) at a point at height of 15 cm from the bottom (see figure). The hole is at a height of 45 cm. When the jar is filled with a liquid up to a height of 30 cm the same observer can see the edge at the bottom of the jar. If the refractive index of the liquid is N/100, where N is an integer, the value of N is _____

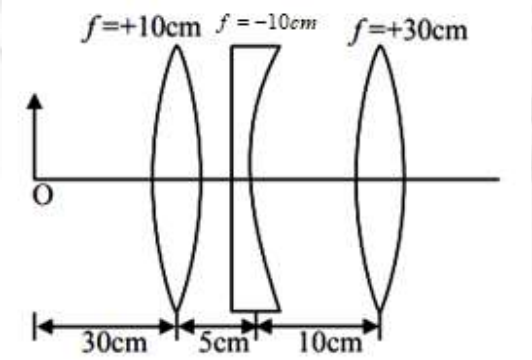


1) 79 2) 69 3) 158 4) 138

43. A light ray enters a solid glass sphere of refractive index $\mu = \sqrt{3}$ at an angle of incidence 60°. The ray is both reflected and refracted at the farther surface of the sphere. The angle (in degrees) between the reflected and refracted rays at this surface is _____

1) 90° 2) 180° 3) 0° 4) 53°

44. Find the distance of the image from object O, formed by the combination of lenses in the figure.



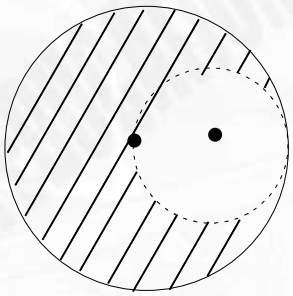
1) 75 cm 2) 10 cm 3) 20 cm 4) infinity

45. ASSERTION (A): A work done by friction is always negative
REASON (R): If frictional force acts on a body, its kinetic energy may decrease.
A) Both ASSERTION (A) and REASON (R) are correct. REASON (R) is a correct explanation for ASSERTION (A)
B) Both ASSERTION (A) and REASON (R) are correct. REASON (R) is not a correct explanation for ASSERTION (A)
C) ASSERTION (A) is correct. REASON (R) is incorrect.
D) ASSERTION (A) is incorrect. REASON (R) is correct.
1)D 2)B 3)A 4)C

SECTION-II (NUMERICAL VALUE TYPE)

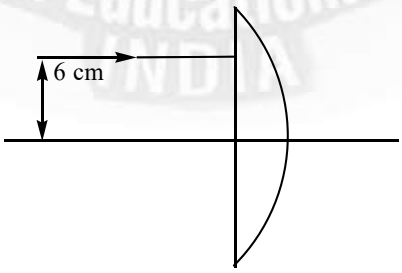
This section contains **5 Numerical Value Type Questions.** The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11).**
Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

46. From a solid sphere of mass M and radius R, a spherical portion of radius R/2 is removed, as shown in the figure taking gravitational potential V = 0

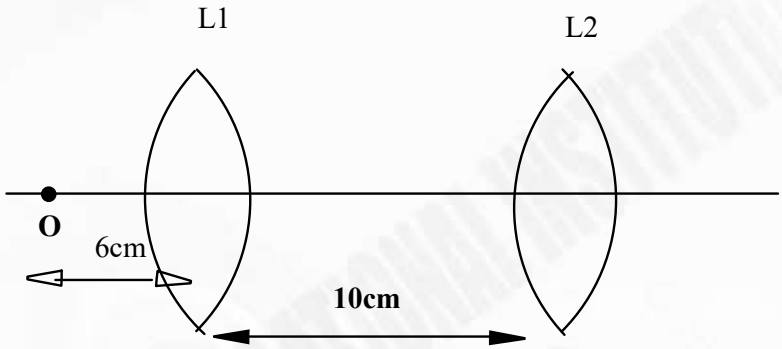


At $r=\infty$, the potential at center of the cavity thus formed is $\frac{-XGM}{R}$. Find X
(G=Gravitational Constant)

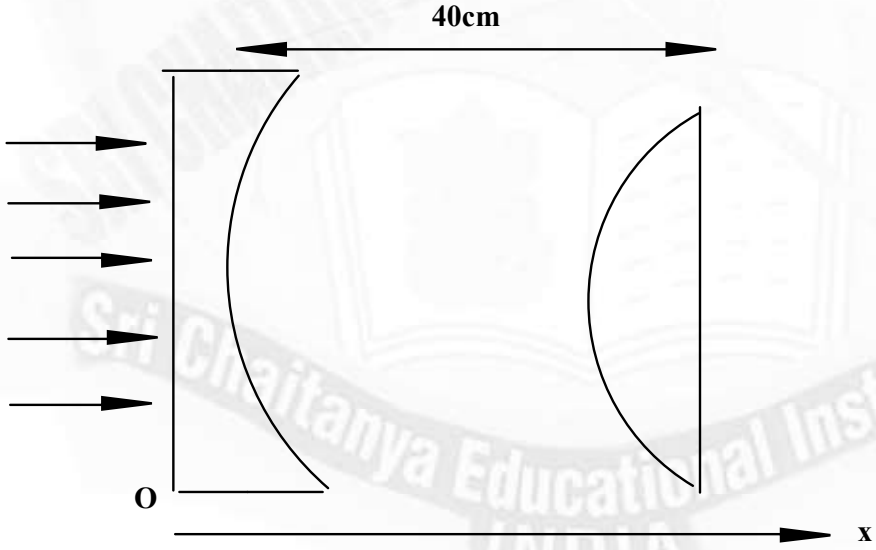
47. A light ray parallel to the principal axis is incident (as shown in the figure) on a thin plano-convex lens with radius of curvature of its curved part equal to 10cm. Assuming that the refractive index of the material of the lens is 4/3 and medium on both sides of the lens is air, the distance of the point from the lens curved surface where this ray meets the principal axis is $\frac{N}{7}$cm, the value of N is



48. A point objet, O is placed in front of two thin symmetrical coaxial convex lenses L_1 and L_2 with focal length 24 cm and 9 cm respectively. The distance between two Lenses is 10 cm and the object is placed 6 cm away from lens L_1 as shown in the figure. The distance between the object and the image formed by the system of two lenses is _____ cm.



49. As shown in the figure, a combination of a thin plano concave lens and a thin plano convex lens is used to image an object placed at infinity. The radius of curvature of both the lenses is 30 cm and refractive index of the material for both the lenses is 1.75. Both the lenses are placed at distance of 40 cm from each other. Due to the combination, the image of the object is formed at distance x = _____ cm, from concave lens.



50. A Plano-Convex lens of focal length 10cm and refractive index 1.5 is silvered at its plane face. The distance d in cm at which an object must be placed in order to get its image on itself is _____

CHEMISTRY

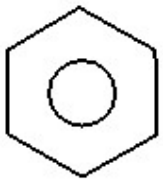
Max Marks: 100

SECTION-I (SINGLE CORRECT ANSWER TYPE)

This section contains **20 Multiple Choice Questions.** Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and –1 in all other cases.

51.



$\xrightarrow[AlCl_3(anhy)]{PhCOCl} X$ *What is X?*

1) Acetone **2)** Acetophenone **3)** Benzophenone **4)** Benzaldehyde

52. Calculate the amount of Calcium oxide required when it reacts with 852 g of P_4O_{10} to form Calcium Phosphate.
1) 10.08 g 2) 1.008 g 3) 1008 g 4) 100.8 g

53. Which of the following on heating with aqueous KOH produces acetaldehyde?
1) CH_3CH_2Cl **2)** CH_2ClCH_2Cl **3)** CH_3CHCl_2 **4)** CH_3COCl

54. STATEMENT-I: K_p can be equal to or less than or greater than K_c
STATEMENT-II: $K_P = K_c(RT)^{\Delta ng}$, thus K_P and K_c depend upon temperature.
1) Both STATEMENT-I and STATEMENT-II are false
2) Both STATEMENT-I and STATEMENT-II are true
3) STATEMENT-I is True, STATEMENT-II is false
4) STATEMENT-I is False, STATEMENT-II is true

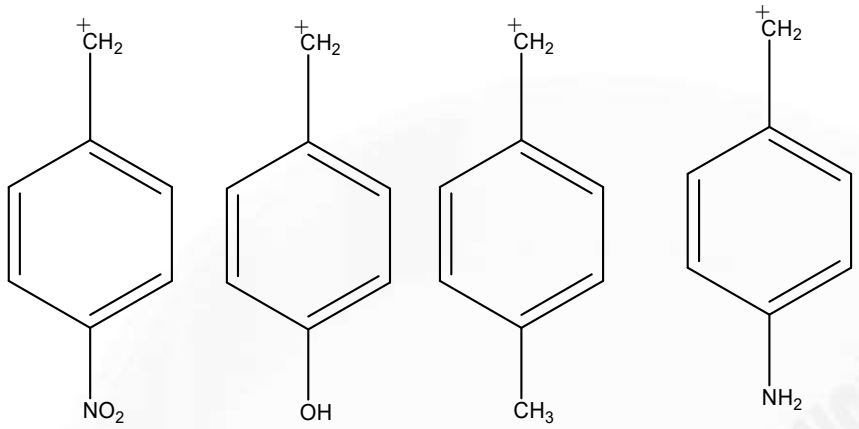
55. The solution of $CuSO_4$ in which copper rod is immersed is diluted to 10 times, the reduction electrode potential will
1) Increase by 0.030 V 2) Decrease by 0.030 V
3) Increase by 0.059 V 4) Decrease by 0.059 V

56. 100 ml aq. Solution of glucose with osmotic pressure 1.2 atm at 25°C is mixed with 300ml of aqueous solution of urea at 2.4 atm, at 25°C. Calculate the osmotic pressure of the mixture.
1) 18.6 atm 2) 2.1 atm 3) 186 atm 4) 0.186 atm

57. For a liquid, enthalpy of fusion is 1.435 kcal mol^{-1} and molar entropy change is 5.26 cal $mol^{-1}K^{-1}$. The freezing point of the liquid (in K) will be
1) 0° K 2) 273° C 3) 273 K 4) 346 K

58. Which ion has highest polarizing power?
1) Mg^{2+} 2) Al^{3+} 3) Ca^{2+} 4) Na^{+}

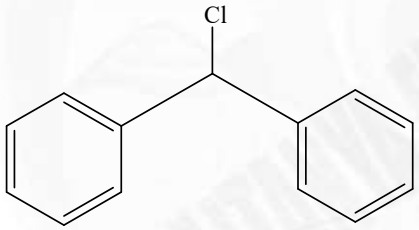
59. Arrange the following in order of decreasing order of their stability

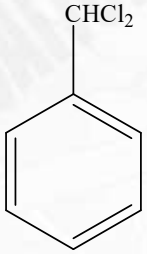


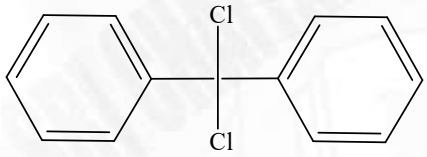
(I) (II) (III) (IV)

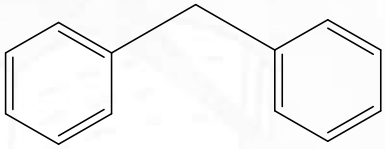
1) I > III > II > IV 2) IV > II > III > I 3) III > II > IV > I 4) II > IV > III > I

60. Which of the following structures correspond to the product expected, when excess of C_6H_6 reacts with CH_2Cl_2 in the presence of anhydrous $AlCl_3$?

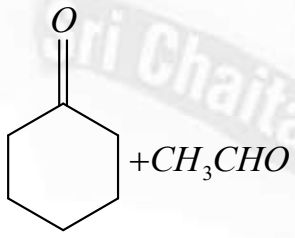
1) 

2) 

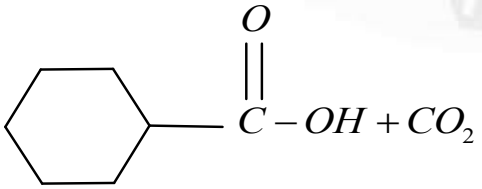
3) 

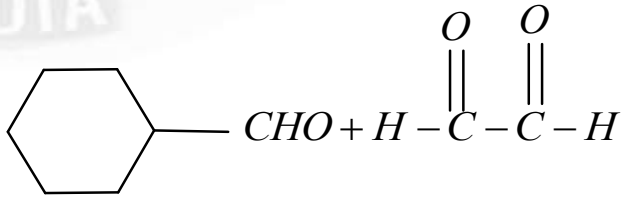
4) 

61. Cyclohexyl ethyne $\xrightarrow[lindlar's\ catalyst]{H_2} A \xrightarrow[(ii)Zn-H_2O]{(i)O_3} B + C$, 'B' and 'C' are

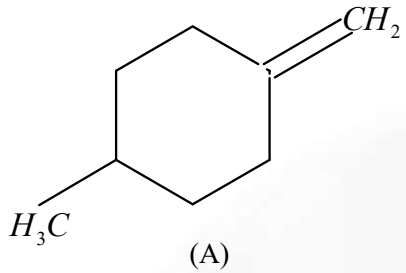
1) 

2) 

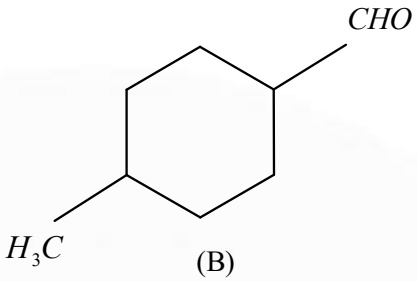
3) 

4) 

62. Which of the following reagents/reactions will convert 'A' to 'B' ?



(A)



(B)

1) PCC oxidation **2)** Ozonolysis

3) $BH_3, H_2O_2 / OH^-$ followed by PCC oxidation

4) HBr, hydrolysis followed by oxidation by $K_2Cr_2O_7$

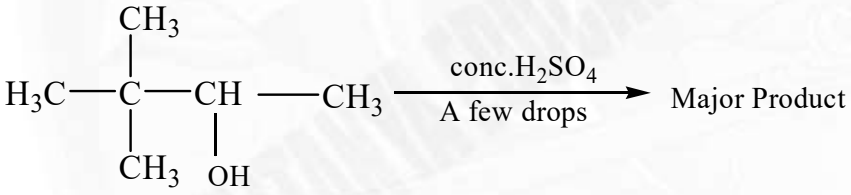
63. Which of the following compound(s) does not gives Aldol condensation reaction.

1) H_3CCHO **2)** PhCHO **3)** $(CH_3)_3CCHO$ **4)** Both 2 and 3

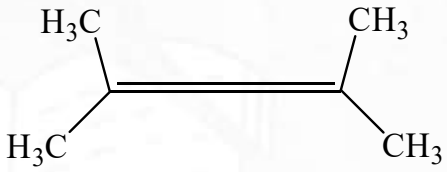
64. Which of the following compound gives positive iodoform test

1) HCHO **2)** Ph – CHO **3)** PhCOCHO **4)** CH_3COCH_3

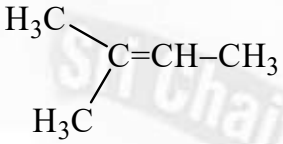
65. The major product formed in the following reaction is:



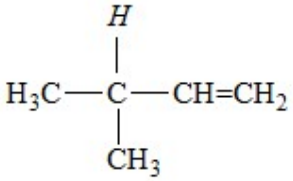
1) $CH_3 - CH = CH - CH_2CH_3$



2)

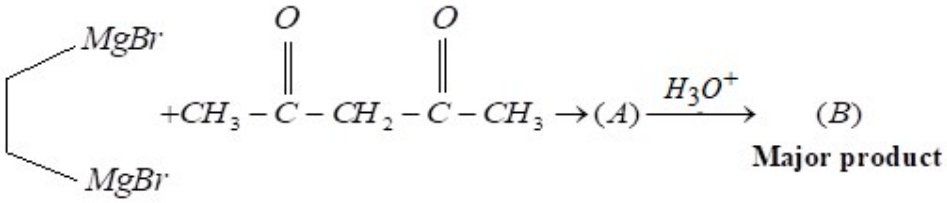


3)

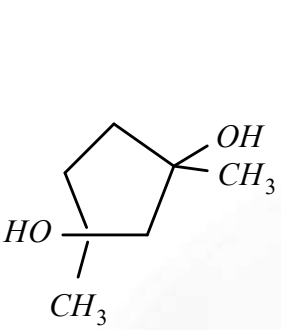


4)

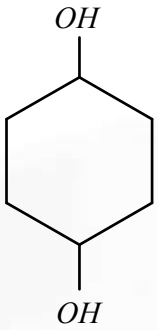
66.



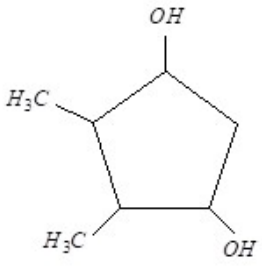
Consider the above reaction sequence and identify the product B.



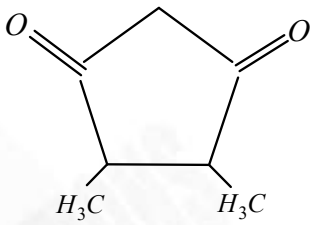
1)



2)

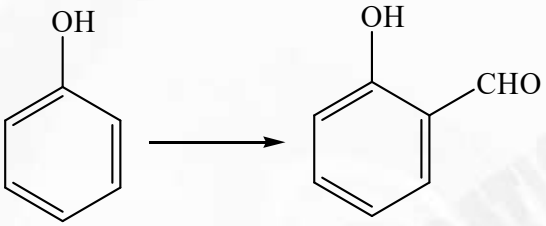
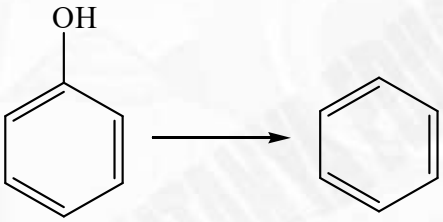
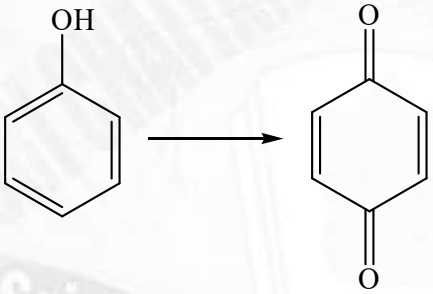
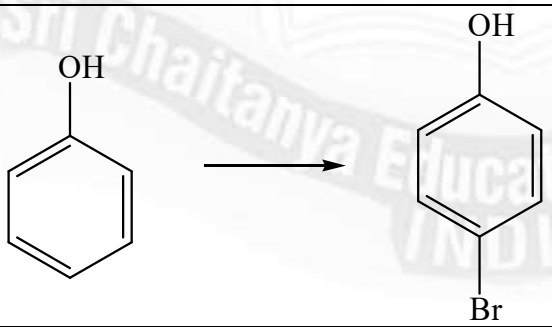


3)



4)

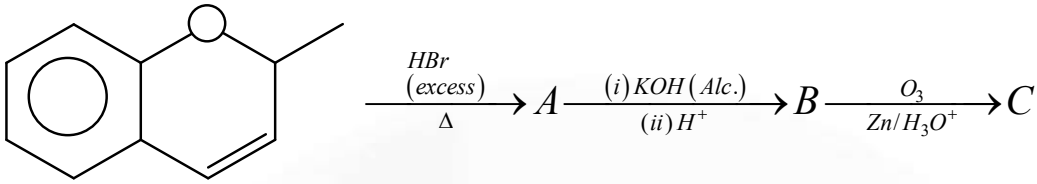
67. Match the LIST-I with LIST-II

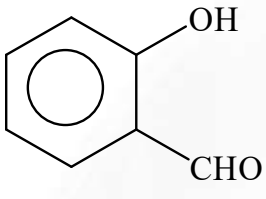
	LIST-I		LIST-II
I)		P)	Br_2 in CS_2
II)		Q)	$Na_2Cr_2O_7/H_2SO_4$
III)		R)	Zn
IV)		S)	$CHCl_3$ / NaOH

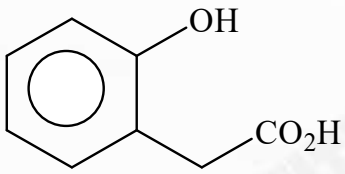
Choose the correct answer from the options given below:

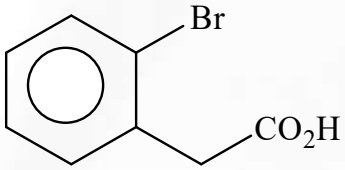
1) I - S; II - R; III - Q; IV - P
2) I - P; II - R; III - Q; IV - S
3) I - P; II - S; III - Q; IV - R
4) I - R; II - P; III - Q; IV – S

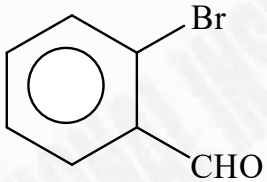
68. The major aromatic product C in the following reaction sequence will be:



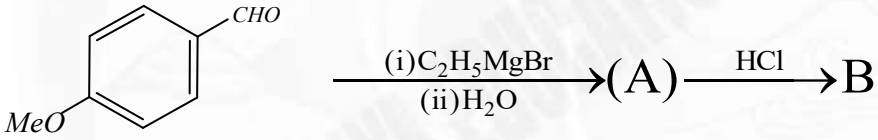
1) 

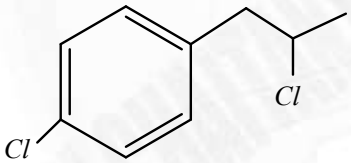
2) 

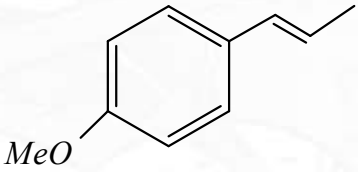
3) 

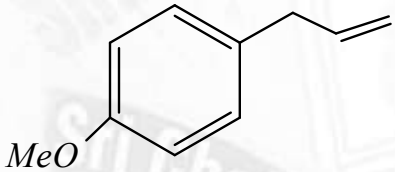
4) 

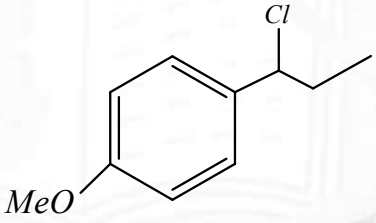
69. The major product B formed in the following reaction sequence is:



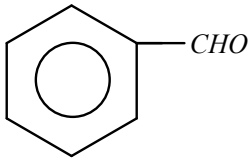
1) 

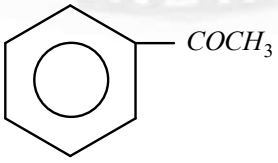
2) 

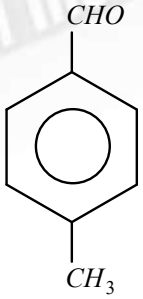
3) 

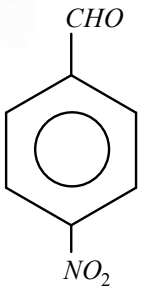
4) 

70. Which one is most reactive towards Nucleophilic addition reaction?

1) 

2) 

3) 

4) 

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions.** The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11).**

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

71. A solution of phenol in chloroform when treated with aqueous NaOH gives compound P as a major product. The mass percentage of carbon in P is_____. (to the nearest integer) (Atomic mas : C = 12; H = 1; O = 16)

72. Compound ' P ' on nitration with dil. HNO_3 yields two isomers (A) and (B). These isomers can be separated by steam distillation. Isomers (A) and (B) show the intramolecular and intermolecular hydrogen bonding respectively. Compound (P) on reaction with conc. HNO_3 yields a yellow compound ' C ', a strong acid. The number of oxygen atoms are present in compound ' C '_____

73. Three moles of AgCl get precipitated when one mole of an octahedral co-ordination compound with empirical formula $CrCl_3 \cdot 3NH_3 \cdot 3H_2O$ reacts with excess of silver nitrate. The number of chloride ions satisfying the secondary valency of the metal ion is_____.

74. Number of stereo isomers possible for bicyclo (2,2,1) heptan-2-one are _____.

75. $C_2H_2 \xrightarrow[Tube]{red\ hot\ Cu} (X)$: $(X) + Acetyl\ Chloride \xrightarrow[acid]{lewis} A$, total number of carbon atoms With sp^2 hybridization in A are _____.

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H.T.No. 254065055*

BELOW 100	BELOW 500	BELOW 1000	BELOW 1000	NUMBER OF QUALIFIED RANKS
ALL INDIA OPEN CATEGORY RANKS	ALL INDIA OPEN CATEGORY RANKS	ALL INDIA OPEN CATEGORY RANKS	ALL INDIA CATEGORY RANKS COUNT	
29	113	205	745	4,212

*DLP/AITS